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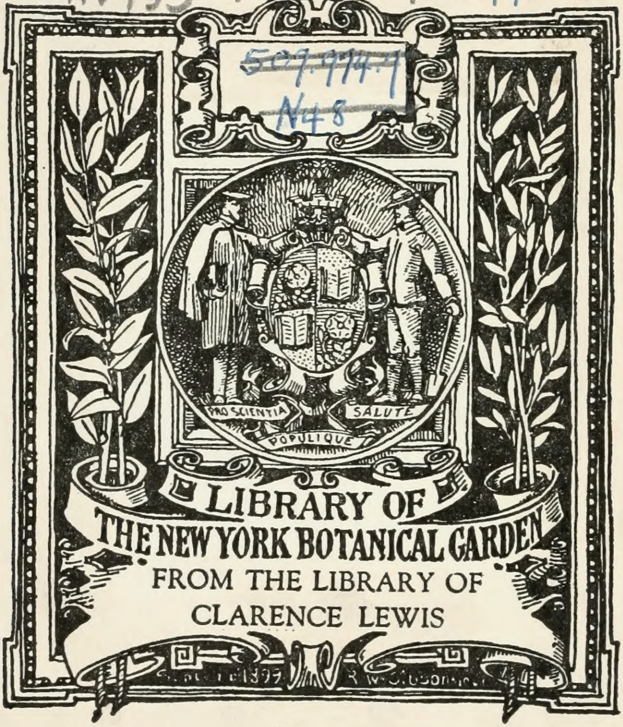

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The University of the State of New York

NEW YORK STATE MUSEUM

71st ANNUAL REPORT

1917

In 2 volumes

VOLUME 2

APPENDIXES 2-3

TRANSMITTED TO THE LEGISLATURE MARCH 30, 1918

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STATE OF NEW YORK

No. 44

IN ASSEMBLY

March 30, 1918

71st ANNUAL REPORT

OF THE

NEW YORK STATE MUSEUM

VOLUME 2

To the Legislature of the State of New York

We have the honor to submit herewith, pursuant to law, as the 71st Annual Report of the New York State Museum, the report of the Director, including the reports of the State Geologist and State Paleontologist, and the reports of the State Entomologist and the State Botanist, with appendixes.

PLINY T. SEXTON
Chancellor of the University
JOHN H. FINLEY
President of the University and
Commissioner of Education

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Appendix 2

Entomology

Museum Bulletins 202, 200

202 33d Report of the State Entomologist 1917

200 Key to American Insect Galls

New York State Museum Bulletin

Entered as second-class matter November 27, 1915, at the Post Office at Albany, New York,
under the act of August 24, 1912

Published monthly by The University of the State of New York

No. 202 ALBANY, N. Y. October 1, 1917

The University of the State of New York
New York State Museum

John M. Clarke, Director
Ephraim Porter Felt, State Entomologist

33d REPORT OF THE STATE ENTOMOLOGIST
ON
INJURIOUS AND OTHER INSECTS
OF THE
STATE OF NEW YORK

1917

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New York State Museum Bulletin

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Published monthly by The University of the State of New York

No. 202 ALBANY, N. Y. OCTOBER 1, 1917

The University of the State of New York
New York State Museum

JOHN M. CLARKE, Director

EPHRAIM PORTER FELT, State Entomologist

THIRTY-THIRD REPORT OF THE STATE ENTOMOLOGIST

1917

Dr John M. Clarke, Director of the State Museum

I have the honor to present herewith my report on the injurious and other insects of the State of New York for the year ending September 29, 1917.

The cold and, in some sections of the State, excessively wet spring produced an unusual condition and many of the insects normally destructive were conspicuous by their absence, while a few comparatively unknown forms caused serious losses, though a portion of these, notably in connection with the work of the seed corn maggot, was due largely to climatic conditions and the employment of methods poorly adapted to the abnormal conditions prevailing. The apple tent caterpillar has almost dropped out of sight as a serious pest, though late in the season a number of leaf feeders, such as the red-humped apple tree worm, the yellow-necked apple tree worm, the fall web worm, the hickory tussock moth caterpillar and some related species were uncommonly abundant and destructive.

Fruit tree insects. An unusually interesting discovery was that of the recently established apple and thorn skeletonizer, Hemerophila pariana Clerck, near Irvington and Nyack. This insect was so abundant in some localities as to skeletonize practically all the foliage, even in orchards of considerable size. The Entomologist made a study of the situation, worked out the life history of the species and in cooperation with agents of the State Department of Agriculture determined the approximate extent of the infested area. A special account has been prepared which will be published as an extension bulletin by Cornell University and well distributed throughout the infested area in an effort to secure general cooperation in checking this pest until such time as natural enemies may bring it under control or experience shows it to be an insect of comparatively minor importance.

Work on the codling moth was continued in cooperation with the bureau of horticulture of the State Department of Agriculture. The spraying operations were continued in the orchard of H. E. Wellman, Kendall, and, owing to unfortunate weather and field conditions, the results, as will be seen by a reference to the detailed account of the work, were not satisfactory. The very cool, wet weather of early spring appears to have prevented the setting of a fair crop of fruit and in many portions of the western part of the State there were almost no apples. The yields on the experimental plots, though promising well at blossoming time, were so small that it was not considered worth while to pick and classify the fruit on the trees sprayed three times, owing to the fact that the crop was so small that very little of value could be secured. These untoward conditions were further accentuated by the extremely muddy condition of the orchard at the time of the first spraying. This materially affected the efficiency of the work. The experiment in Niagara county was continued in the orchard of George Mead of Barker and there conditions were much better than in the Kendall orchard, since there was a larger crop and fairly satisfactory returns were obtained from the spraying, though the benefit secured was not nearly so great as that which had been obtained in earlier years in the Hudson valley. The small crop of fruit mentioned above was also accompanied by an unusually heavy infestation by codling moth and the two combined prevented obtaining high percentages of worm-free fruit, though substantial benefits were secured on the sprayed trees, as compared with the unsprayed or checks.

Apple maggot. The work of last year with this pest was continued in the orchard of Edward Van Alstyne of Kinderhook. The test made with the late application of a poison just as the flies began to appear was followed by a very gratifying freedom of injury on trees where there was very serious damage to the fruit last year. Variations in the numbers of this insect are so great that we do not feel warranted in expressing definite conclusions from the results of one season.

Leaf roller. Our observations show this insect to be less abundant in the western part of the State than was the case two years ago, due, probably, to the work of natural enemies.

Red bugs. Injuries by these two pests are becoming increasingly apparent here and there in the State and fruit growers are suffering considerable losses from the work of these bugs. The fact that there are two species, both of which may occur in the orchard, one being abundant a little earlier than the other, complicates control measures, since recommendations of value in the case of the earlier species are of comparatively little service if the infestation is largely due to the later and lacking expert examination it is usually impossible to determine the troublesome form until the damage has been caused.

San José scale. This pest is relatively much less abundant than in earlier years, this being particularly true in the Hudson valley. Observations and reports from all sections of the State indicate a generally satisfactory control where there is thorough spraying with the lime sulphur wash at winter strength and in some localities there is little or no damage even in unsprayed orchards. The work of parasites, first brought to attention a few years ago, continues and it is probable that these minute insects are not unimportant factors in bringing about this gratifying condition.

Pear thrips. The situation with respect to this insect remains nearly unchanged. It is sporadically abundant and destructive here and there in pear-growing sections, especially in the Hudson valley, and despite efforts of fruit growers there is likely to be considerable loss before the seriousness of the infestation is appreciated.

Pear psylla. There has been considerable pear psylla in Hudson valley orchards due, in some cases at least, to the delayed dormant spray not being held until practically all the eggs have been deposited. This pest, like the pear thrips, can be controlled to best advantage only by applications given within rather closely defined time limits and many growers experience difficulties in recognizing the periods when work of this kind can be done to the best advantage.

Gipsy moth. An examination of the region formerly infested shows a very gratifying condition in that no living insects in any stage have been found within two years and the thorough spraying and other work prosecuted in this attempt to exterminate the insect augurs well for the successful completion of a difficult and costly, though economical, undertaking.

Grass and grain pests. The cold weather and copious rains of last spring were unfavorable to the development of sufficient grasshoppers to cause serious damage and in most sections these insects were not unusually abundant, though as the season advanced small areas, especially beside orchards, were found to be infested with considerable numbers. The use of grasshopper bait was advised in a number of such places and in several instances rather serious damage to young fruit trees was reported, due to ignoring the insects earlier and allowing them to develop unchecked.

May or June beetles were unusually numerous in many sections of the State, defoliating or partly defoliating individual trees and, in not a few instances, strips of woodland. This condition was pointed out earlier and an effort made to interest the farmers in noting these results for themselves, since the amount of feeding affords a basis for estimating the probabilities of damage another season to susceptible crops, such as corn and potatoes planted upon sod land near badly affected trees. In cooperation with the Insect Pest Survey and Information Service it has been possible to make what is practically a May or June beetle survey of the State and as a result there has been brought together a mass of data which can be used to great practical advantage in indicating areas where serious injury by the destructive white grub is likely to occur next year. The information has been summarized and it is planned to distribute this early next spring so as to prevent, so far as possible, serious losses by planting upon land badly infested by these destructive pests.

The wheat midge was somewhat injurious to heading rye in various parts of the State and later was found in many wheat fields. It was estimated that the loss in southern Niagara and northern Erie counties caused by this insect would approximate 20 per cent in shrunken wheat. The actual loss in other wheat-growing counties appears to be considerably less, that in Orleans county being placed at 3 to 5 per cent. This damage, comparatively rare during recent years in New York State, was largely due to unusual climatic conditions at the time the grain was heading and there is little probability of its recurring another year.

Field crops. The work of the seed corn maggot in bean fields came to notice the last of June and was very serious, the loss on seed alone in one 9-acre field in Genesee county amounting to $70, while from 50 to 75 per cent of 16 acres were destroyed. One Monroe county grower lost over $300 on seed alone. The damage for Erie county was put at 40 per cent and it was estimated that one-quarter of $96,000 worth of seed was destroyed in Orleans county. Untoward weather conditions and deep planting on the wetter land appear to have greatly augmented losses, while the total damage was increased by the work of snails, millipeds and disease.

Potato aphis appeared in July on Long Island and became quite abundant and very injurious in some fields of many counties, Lewis being one of the last to report infestation. This insect breeds very rapidly, has a considerable range of food plants and under certain conditions is most destructive. It is usually checked by parasites, which appears to have been the case in many localities, though severe losses were reported for individual fields. The estimated loss in Dutchess county was placed at 5 per cent. It was ranked as a plague in Orleans county. It caused serious trouble for some large growers in Ulster county and was very injurious in gardens, the estimated decrease in the crop ranging from 10 to 75 per cent, with total loss in isolated cases. Growers agree as to the beneficial results following early and thorough spraying with a tobacco soap preparation.

Shade tree insects. The urgent necessity of producing large crops the past season has resulted in more attention being given to their insect enemies than to those occurring upon shade trees. It is perhaps fortunate that the season was exceptionally favorable to the growth and development of trees and consequently there was comparatively little damage by shade tree insects.

Forest tree pests. The statements made above in relation to shade trees apply in large measure to forest trees, though the latter part of the season was marked by an unusual abundance of hickory tussock moth caterpillars and some of their allies and a corresponding anxiety as to the probabilities of injury, not only during the present season but in the future.

Greenhouse and garden pests. The injurious Florida fern caterpillar, recorded in the last report as having become established in a Lockport greenhouse, appears to have been exterminated. Reports have been received of this insect having become established in other portions of the country, and now that its destructive nature is more fully appreciated the probabilities are that it will be effectually excluded by the exercise of a moderate degree of care in preventing the introduction of infested plants.

The destructive chrysanthemum midge has been reported during the year from a number of localities in the United States and Canada, several being in Massachusetts and adjacent states. It has not, to our knowledge, been found in New York, though as pointed out earlier it is likely to be brought in with infested plants and when thoroughly established is capable of causing serious damage.

Another introduction, though not new to the continent, is the establishment of the European earwig, Forficula auricularia Linn., in East Aurora. This European insect appears to be abundant and generally established there. It is best known because of its annoying habits rather than on account of the injury it causes. It was probably introduced with infested plants and is another illustration of the gradual dissemination of species with habits which lend themselves readily to distribution through commercial agencies.

Flies and other pests. The necessity of controlling these insects has been greatly emphasized by the extensive mobilization of troops, particularly as more than half of the deaths in armies during recent wars have resulted from diseases rather than from wounds. The almost constant demand for information relating to household insects had practically exhausted the edition of State Museum Bulletin 136 dealing with the Control of Flies and Other Household Insects, and with the above facts in mind an extended and almost entirely rewritten edition entitled Household and Camp Insects, was issued as State Museum Bulletin 194 and widely distributed among sanitary officers of the army as well as to those specially interested in work of this kind throughout the country.

Insect pest survey and information service. This special war activity was organized last May in cooperation with the New York State Food Supply Commission, the State College of Agriculture, the farm bureaus, the State Experiment Station, and other agencies cooperating with the State Entomologist. An additional stenographer was engaged in this work from May 23d to July 31st. This service, since its organization and up to September 1st, sent out 729 letters, 4763 copies of circulars, 1729 copies of the fifteen weekly digests prepared, 1754 report blanks and 12,174 pages of circular matter. It has received 606 reports from over 100 correspondents located in all parts of the State, mostly representatives of the New York State Food Supply Commission.

The main purpose of the survey was to secure early and accurate reports from all over the State, to summarize the information thus obtained, distribute it promptly, and thus promote the checking or prevention in large measure of the numerous losses naturally inflicted by insect pests. Particular emphasis was laid upon the initial signs of injury in order that the insects might be controlled before material damage had been inflicted. The survey was closely articulated with the control work in the field under the supervision of Messrs Crosby and Matheson of Cornell University. The more important crops received first attention, especially the insect enemies of potatoes, fruits (such as apples, pears, peaches and cherries), cereal and forage crops and truck and garden crops. The importance of this work may be gauged somewhat by an estimate made in 1913 which placed the approximate loss caused by insects in this State to all farm crops at $20,000,000.

The organization outlined above had one or more active agents in practically every county of the State and has made feasible a closer watch upon insect developments than has heretofore been possible. The experience of the past season repeatedly showed that insect outbreaks in the southern part of the State, especially the lower Hudson valley and Long Island, were likely to develop later in the more northern sections and that hence the conditions in one region could be used to indicate probabilities in others. The fifteen weekly digests not only recorded conditions in various sections of the State and outlined preventive or remedial measures but also estimated the possibility of subsequent damage by various insects.

Particular attention was paid to the possibilities of preventive or early remedial work. In carrying this out several circulars were issued, especially one on fruit insects and crop pests, mailed May 30th, another discussing the destructive red bug and pear psylla was issued June 2d, a third on spraying fruit trees with special reference to the control of the codling moth was mailed June 7th. A circular calling attention to the work of the extraordinarily abundant May or June beetles was issued June 11th. One discussing the seed corn maggot so destructive in the bean-growing regions was prepared June 18th and the day outbreaks of the army worm on Long Island were reported was marked by the preparation of a circular calling attention to early indications of attack by this greatly feared pest and giving in summarized form the more approved control and remedial measures. The wheat midge injuring rye and wheat, the midsummer leaf feeders of the apple orchard, the insect pests of domestic animals and the Hessian fly were likewise discussed in timely circulars.

The correspondence reported above has been largely with county representatives of the New York State Food Supply Commission. Special effort was made to keep these persons thoroughly posted as to the latest developments and the best methods of dealing with various perplexing insect problems. These in turn have passed the information along to their numerous correspondents and the effort can not fail to have greatly increased interest in the problem of insect control as well as promote greater efficiency along these lines.

Gall insects. The preparation of an illustrated Key to American

Gall Insects now in press has resulted in much interesting material being submitted for study. This is true of the work of several gall wasps or cynipids, namely, the ribbed bud gall and the white oak club gall, deformations which are occasionally very abundant and injurious. Brief discussions of the work and biology of these species appear below.

There have been some exceptionally interesting gall midges submitted for study, namely, a small collection from India and a larger one of mostly reared species from the Philippine islands. This material has been worked up, that relating to the former has been published and the manuscript of the latter has been submitted for publication in the Philippine Journal of Science, together with a complete tabulation for the families, tribes and genera of the Itonididae, which latter should do much toward placing the classification of this large and very diverse group upon a thoroughly scientific basis.

Lectures. The Entomologist has delivered a number of lectures on insects, mostly economic species, before various agricultural and horticultural gatherings, some of these being in cooperation with the Bureau of Farmers Institutes or county farm bureau agents. Several lectures have also been given under the auspices of local welfare associations.

Publications. A number of brief popular accounts of the more injurious insects have been prepared and widely circulated among county farm bureau and New York State Food Supply Commission agents, the latter as a part of the Insect Pest Survey and Information Service.

Owing to delay in printing the report for 1916, the only State Museum Bulletin from this office issued during the past year is No. 194, Household and Camp Insects, briefly mentioned above. Several important papers have appeared in current entomological journals, such as " New Western Gall Midges " in the Journal of the New York Entomological Society, " New North American Gall Midges " and " New Indian Gall Midges," both in Entomological News, and " Distribution of Gall Midges " in the Proceedings of the National Academy of Sciences.

Collections. Additions to the state collections are constantly being made, especially of specimens representing the early stages and work of various injurious forms, since biological material of this character greatly facilitates the identification of insects and is indispensable in a well-prepared exhibit illustrating the life histories of various species.

Owing to the pressure of work incident to conducting the Insect Pest Survey and Information Service, a large amount of labor was necessarily devoted to the identification of numerous specimens and as a consequence it was impossible to give the usual amount of time to the very desirable and really necessary work of classifying and arranging specimens already in the state collections. Numerous microscopic preparations of smaller insects have been made and incorporated in the collections as in earlier years.

The work upon exotic Itonididae referred to above has resulted in adding a number of types, both generic and specific, to an already very large collection. A unique addition was that of Mr Howard Notman of Keene Valley and Brooklyn, who generously donated a collection of 648 admirably mounted specimens taken at Keene Valley, a locality where comparatively little collecting has been done in this group. Attention should also be called to the bees kindly donated by Prof. T. D. A. Cockerell of Boulder, Col., and to the African insects secured by exchange with Prof. H. T. Fernald of Amherst, Mass. Other acquisitions are listed under Additions to Collections.

The constantly increasing specimens have filled the boxes or trays to such an extent that there is urgent need of more space for this material. The wooden cases containing the insect collections should be replaced by steel cabinets and more provided to accommodate the additional boxes and trays required. No adequate provision has as yet been made for the constantly increasing biological material, which is also true of the large number of microscopic slides, many of them containing types of species and genera and therefore unique. A metallic filing case for the collection of negatives and photographs illustrating insects or their work is also greatly needed.

Earlier estimates indicate a native fauna of approximately 20,000 species which means fully 100,000 specimens if we are to have only one representative of each sex and of each of the three other stages, namely egg, larva and pupa, to say nothing of specimens illustrating work and habitat. Many species should be represented by series illustrating variations and habits. A state collection should possess all these if it is to take its proper place in the exposition of our natural resources. Much has been accomplished through the natural history survey work summarized in the preceding report, though very much still awaits the competent investigator. The urgency of the immediately practical should not eliminate research, since progress is possible only through the latter. This is true not only of the development of a representative collection, itself an indispensable aid to the best economic work, but is fundamental in establishing effective methods of controlling many destructive insects. There is a great need of a more adequate development of the work along these lines if the entomological branch of the Museum is to discharge its full duty to both State and Nation.

Office matters. The assistant entomologist has been in charge of the office and responsible for correspondence and other matters during the absence of the Entomologist. The usual routine, except as mentioned above, has fully occupied the time of various members of the staff. The conduct of the Insect Pest Survey and Information Service described above meant much extra work for all members of the staff during the busier portion of the season.

Nursery inspection. The nursery inspection work of the State Department of Agriculture has resulted, as in former years, in a number of specimens representing various stages of insect development, some in very poor condition, being submitted to this office for identification. As such material may originate in a foreign country, determinations of this character are laborious and require for their successful prosecution a large collection and an excellent library of both domestic and foreign works. The correct identification of such material is important, since the disposal of an entire shipment of nursery stock must depend in considerable measure upon the character of the infestation.

General. The work of the office has been materially aided, as in past years, by the identification of a number of species through the courtesy of Dr L. O. Howard, chief of the bureau of entomology, United States Department of Agriculture, and his associates. There has been, as already stated, very effective cooperation with the State Department of Agriculture, the New York State Food Supply Commission and its agents, the county farm bureaus, the State Experiment Station and other public welfare organizations in the State. A number of correspondents have donated valuable specimens and many have rendered efficient service by transmitting local data respecting various insects. It is a pleasure to note that there has been, as in the past, a most helpful cooperation on the part of all interested in the work of the office.

Respectfully submitted
EPHRAIM PORTER FELT
October 16, 1917 *State Entomologist*

INJURIOUS INSECTS

CODLING MOTH

Carpocapsa pomonella Linn.

The experimental work of the last two years, with particular reference to the serious injury caused by the codling moth in the western part of the State, was continued the past season in cooperation with the bureau of horticulture of the State Department of Agriculture and the Orleans county farm bureau. The orchards selected for the experiments were located through the courtesy of Messrs L. F. Strickland of Lockport and A. B. Buchholz of Albion, both agents of the State Department of Agriculture. An effort was made, as in preceding years, to secure orchards which promised a fairly good and uniform crop and in Niagara county we were successful though, owing to the general light crop in Orleans county, the crop on the experimental trees was much smaller than one could wish.

The orchards selected were those of Messrs George Mead of Barker and H. E. Wellman of Kendall, the former in Niagara and the latter in Orleans county. Every facility was placed at our disposal, these gentlemen spraying in substantially the same manner as in preceding years. In each case the men and the equipment on the place were used, the Entomologist or his representative supervising the operations. There were, as originally planned, twenty experimental trees in each orchard though, owing to the special conditions obtaining, an additional plot composed partly of Baldwins and partly of greenings was laid out in the Barker orchard. The very small yield in plots 2 and 3 in the Kendall orchard resulted in the determination to omit the third spraying, a decision abundantly justified by the scattering crop on plot 3, in particular, at picking time. Various observations were made and reported during the season by Messrs L. F. Strickland and F. J. Rimoldi and these gentlemen, together with Mr L. H. Spooner and Mr J. B. Achilles, assisted in the classification of the fruit.

Life history and habits. An outline of the life history of this pest may well be given before the details of the experimental work are discussed, since a knowledge of the habits of this insect is essential to an appreciation of the data. The codling moth or apple worm winters in a tough, silken cocoon, usually located in an oval cell under the rough bark of trees. The caterpillars transform to brown, apparently lifeless pupae in late April or early May and the moths commence to emerge and continue to appear throughout the greater part of June. Cool evenings, that is, a temperature below 60° F., may delay egg laying considerably, which appears to be an important factor in the western part of the State. The minute whitish eggs are deposited largely on the leaves though under certain conditions, as shown by our observations of the last two years, they may be more abundant on the young fruit. The eggs hatch in about a week and consequently the young larvae of the first brood may be entering the fruit from early in June, approximately three weeks after the blossoms fall, to the end of the month and even to the latter part of July. Some of these young caterpillars, especially those hatching from late deposited eggs, have the habit of gnawing a small hole in the side of the fruit, excavating a circular gallery with a radius of approximately one-sixteenth of an inch and then deserting this cavity and entering at the blossom end. This is particularly likely to occur in the western part of the State during late June and early July and is very generally known as " side injury " and is the type characterized in our tabulations of last year and the past season as " shallow." The caterpillars require about four weeks to complete their growth, at which time they desert the fruit, wander to a sheltered place, spin a cocoon, transform to pupae and in about two weeks, namely, the last of July or early in August, another brood of moths may appear. These in turn deposit eggs which hatch in due time and the young larvae enter the side of the fruit, especially where two apples touch or a leaf hangs against the apple, as well as at the blossom end. Two broods appear to be the rule in the northern fruit-growing section of the United States, the second being a partial one usually in western New York. Some investigators claim a third brood in the southwest. Most of the partly grown larvae found in winter apples at picking time belong to the second brood, while those fully developed may have come from late-deposited eggs of the first brood, much depending upon the season.

CODLING MOTH EXPERIMENTAL WORK

Barker Orchard

The work in Niagara county was continued in the orchard of Mr George Mead at Barker. The trees were large, thrifty, some 27 years old, and mostly Baldwins.

Plot 1 was located in the first and second rows on the south side and next to a peach orchard and on the fourth to sixth rows, inclusive, from the west side. Plot 2 was on the third row from the peach orchard and the second and third rows from the west side, the latter being occupied by a young apple orchard. Plot 3 began with the fourth row from the south side and was on the fifth and sixth rows from the west side. There was also a fourth plot which was on the fifth row from the south side and the third and fourth rows from the east side. This last consisted of three Baldwin trees and three greenings. The two check trees were the second and fourth trees from the west side and in the second row from the north.

The first application was made June 9th. Tiger nozzles were used, three on the tower with a 10 foot extension and two on the ground. The distribution was excellent and the trees were well covered. Thomsen's arsenate of lead was used at the rate of 2½ pounds to 50 gallons of water and lime sulphur 32° Baume 1 to 40. A pressure was maintained of from 175 to 200 pounds and about 20 gallons of material were applied to each tree.

The following notes were made at spraying time. Plot 1, trees A and E, and plot 2, tree C, had a light bloom. Tree E in plot 2 had only about one-fourth of a bloom. The trees in plot 3 were well and heavily loaded with blossoms and those of plot 4, both greenings and Baldwins, showed a good bloom and at the time of spraying about one-third of the blossoms had fallen from the greening trees.

The second spraying in this orchard was given July 9th, the work beginning at 9.40 a. m. but, owing to engine troubles, the spraying was not completed until afternoon. Trees A, C and E of plot 4 and one-half of the other three were nearly completed in the morning. The work was exceptionally thorough. There were two leads of hose, one man standing on the tower and the other working from the ground. There was very little breeze, the foliage was well loaded with the spray and yet there was comparatively little dripping. Ten pounds of Thomsen's orchard brand arsenate of lead was used to 200 gallons and lime sulphur at the rate of 1 to 40.

Plots 2 and 3 were sprayed later under the supervision of Mr Spooner. It was stated that trees C and E of plot 4 were not sprayed from the under side in the pink of the bloom and consequently there was perceptibly more scab than on other trees in this plot, although there is a fairly good crop of fruit, and the same is true of the other trees.

The third application was made August 6th. The spraying on plot 3, Baldwins, began at 10.20 and was completed by noon, approximately 120 gallons being applied to the 12 trees. There was very little air, the weather was light cloudy and conditions were almost ideal for spraying. Only one lead from the tower was used and the spray covered everything thoroughly.

At this time side entrances or "shallows" were very evident and a canvass of 63 affected apples picked from various trees, except experimental ones, gave the following results: there were in this lot 79 typical "shallows" and 19 others showing ".shallows" infested by larvae. Forty of the 63 apples gave evidence of work in the end, though in most cases the damage was very slight. Three others showed work in the end and also larvae. One apple had a deep entrance beside the stem and 3 deep entrances in the side. The data conclusively show that a very large proportion of the "shallow" entrances are deserted by the first brood and the abundance of castings indicated that a great deal of the work was recent and due to larvae hatching from late-deposited eggs of the first brood of moths.

Plot 1, tree F. All the apples within reach from the ground were carefully examined without removing any and 116 entrances found on 363 apples and in addition 3 egg shells.

Plot 2, tree E. A similar examination resulted in finding 16 entrances on 151 apples.

Plot 3, tree C. Twenty-seven entrances were found on 172 apples and an examination in the top resulted in finding but 9 entrances on 118 apples. Tree E of the same plot gave 16 entrances on a total of 141 apples.

Check trees. A similar examination showed 34 entrances on 63 apples.

By far the most of these entrances recorded above were typical "shallows."

The greenings in this orchard were picked the first week in October, the classification of the fruit being looked after by Mr Strickland and his assistants. The Baldwins were picked the following week, namely, October 10th and 11th, and through a misunderstanding the apples on the ground were picked up and disposed of before there was an opportunity of classifying them, hence the data given below in relation to all trees except the greenings is based on the fruit upon the trees at the time of picking.

Barker orchard, plot 1 (sprayed once) 1917

TREE	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY				
					Total	End	Side July	Shallow	Side August
A	588	231	225	71	122	6	30	68	32
Per cent	.....	39.28	38.26	12.07	20.74	1.02	5.10	11.57	5.44
B	1 760	896	375	287	296	13	62	204	40
Per cent	.....	50.90	21.30	16.29	16.82	.73	3.52	11.59	2.27
C	1 917	974	417	225	428	11	81	249	92
Per cent	.....	50.80	21.75	11.73	22.32	.57	4.22	13.01	4.79
D	1 139	572	209	243	159	6	24	112	25
Per cent	.....	50.22	18.35	21.34	13.95	.52	2.10	9.83	2.19
E	No crop								
F	1 988	1 170	117	404	395	15	108	226	75
Per cent	.....	58.85	5.88	20.32	19.86	.75	5.43	11.36	3.77
Total	7 392	3 843	1 343	1 230	1 400	50	305	859	264
Per cent	.....	51.98	18.16	16.63	18.93	.69	4.12	11.62	3.57

The yield on plot 1 varied from 588 apples on tree A to nearly 2000 on tree F. There was practically no crop on tree E and hence this was not picked. It will be noted that the perfect fruit ran moderately high and there was not a very great variation in scabby apples, except in the case of tree F, which was exceptionally clean, producing only 5.88 per cent of fruit thus affected. The percentages of wormy apples varied from 13.95 on tree D to 22.32 on tree C, a difference certainly not due to the crop, since the more heavily laden tree had the larger percentage of wormy apples. The average percentage of wormy apples for the entire crop amounted to 18.93. This last figure should be compared with the 54.06 and 35.33 per cent of wormy fruit on the check trees, the average for the two being 41.69. It should be noted that nearly two-thirds of all the apples on the entire plot showed the characteristic shallow type of injury, that the end wormy were reduced to almost half of 1 per cent and the side July and side August are slight though relatively hardly greater than was found on plot 1 of the Kendall orchard last year.

Barker orchard, plot 2 (sprayed twice) 1917

TREE	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY				
					Total	End	Side July	Shallow	Side August
A	1 486	1 055	137	115	198	2	24	169	7
Per cent	.....	70.99	9.21	7.73	13.32	.13	1.61	11.37	.47
B	1 652	809	559	104	300	4	54	244	6
Per cent	.....	48.97	33.83	6.29	18.16	.24	3.26	14.77	.36
C	2 559	1 797	377	157	357	2	57	285	14
Per cent	.....	70.22	14.73	6.13	13.95	.07	2.22	11.13	.54
D	68	31	11	14	18	.....	.....	17	1
Per cent	.....	45.60	1.68	2.06	26.58	.....	.....	2.50	.15
E	1 227	744	110	126	292	3	33	243	34
Per cent	.....	60.63	8.96	10.26	23.79	.24	2.68	1.98	2.77
F	1 695	994	316	200	240	4	26	195	18
Per cent	.....	58.64	18.64	11.79	14.16	.23	1.53	11.50	1.06
Total	8 687	5 430	1 510	716	1 405	15	194	1 153	80
Per cent	.....	62.50	17.38	8.24	16.17	.17	2.23	13.27	.92

The yield for plot 2 is nearly the same as for plot 1. There is a decidedly larger percentage of perfect fruit, namely, 62.50 and a slightly smaller amount of scabby apples, namely, 17.38. Leaf roller infestation was only about one-half, being for this plot 8.24, whereas in plot 1 it is 16.63 per cent. There is a slight reduction in the wormy fruit, the variation for individual trees ranging from 13.32 per cent for tree A to 26.58 for tree D. The former was one of the more heavily laden trees, while the latter bore a very small crop. The average percentage of wormy fruit for the entire plot was 16.17, less than one-fifth of 1 per cent (.17 per cent) being end wormy and a relatively high proportion, 13.27 per cent, showing the shallow type of injury.

Barker orchard, plot 3 (sprayed three times) 1917

TREE	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY				
					Total	End	Side July	Shallow	Side August
A	2 696	1 494	885	207	277	10	38	255	5
Per cent	.....	55.41	32.82	7.67	10.27	.37	1.41	9.45	.18
B	1 814	1 117	492	143	159	4	22	141	1
Per cent	.....	61.57	27.12	7.88	8.76	.22	1.21	7.77	.05
C	2 311	1 408	544	220	246	1	30	222	3
Per cent	.....	60.92	23.53	9.52	10.65	.04	1.29	9.60	.13
D	2 137	1 047	929	273	217	4	28	194	3
Per cent	.....	48.99	43.47	12.77	10.15	.18	1.31	9.07	.14
E	437	292	36	63	64	1	6	57	......
Per cent	.....	66.82	8.23	14.41	14.64	.23	1.37	13.04	......
F	1 620	578	827	192	187	4	25	158	2
Per cent	.....	35.67	51.05	11.85	11.54	.24	1.54	9.75	.12
Total	11 015	5 936	3 713	1 098	1 150	24	149	1 027	14
Per cent	.....	53.89	33.71	9.96	10.44	.22	1.35	9.32	.13

Barker orchard, plot 4 (sprayed three times) 1917

BALDWINS

TREE	TOTAL FRUIT	PER-FECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY				
					Total	End	Side July	Shallow	Side August
B No.	2 729	1 925	76	268	389	5	33	355	6
Per cent	.....	70.53	2.78	9.82	14.25	.18	1.20	13.01	.22
C No.	3 396	1 560	1 480	206	353	5	41	318	....
Per cent	.....	45.93	43.58	6.06	10.39	.15	1.21	9.36	....
Total	6 125	3 485	1 556	474	742	10	74	673	6
Per cent	.....	56.89	25.40	7.74	12.11	.16	1.21	10.99	.09

GREENINGS

TREE	TOTAL FRUIT	PER-FECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY				
					Total	End	Side July	Shallow	Side August
A [1]No.	1 101	487	257	206	182	.....	26	149	7
Per cent	.....	44.23	23.34	18.71	16.53	.....	2.36	13.53	.63
D No.	921	529	141	206	98	.....	24	66	2
Per cent	.....	57.43	15.30	22.36	10.64	.....	2.60	7.16	.22
F No.	2 196	1 513	204	324	225	.....	36	190	7
Per cent	.....	68.89	9.28	14.75	10.24	.....	1.63	8.65	.32
Total	4 218	2 529	602	736	505	.....	86	405	16
Per cent	.....	59.95	14.27	17.44	11.97	.....	2.04	9.60	.38

Plot 3 produced the largest crop, approximately one-half greater than that of each of the two preceding. There is a higher percentage of perfect apples and also a larger proportion (33.71 per cent) of scabby fruit. There is a decidedly smaller percentage of wormy apples, namely, 10.44, which in our estimation is attributable in considerable measure to the larger crop. The variation per tree ranged from 8.76 to 14.64, the former being one of the more heavily fruited trees and the latter from the one with the lightest crop. The end wormy average nearly as in the preceding plot, namely, a little over one-fifth of 1 per cent (.22 per cent), while practically but 9 per cent of all the wormy apples show the shallow type of injury.

Plot 4 was laid out for the purpose of getting a little comparative data in relation to the injury to the different varieties. Unfortunately it was not possible to classify the fruit on the ground under the Baldwin trees, namely, trees B and C, though this was done in the case of the greenings, trees A, D and F. There was a light crop on the latter, the three trees producing only about two-thirds of the yield of the two Baldwin trees. Nevertheless, it will be seen that there is a fairly close comparison between the results obtained upon these different varieties in the same plot, subjected as near as might be to similar treatment, except that in the case of scab infection a considerably higher percentage, namely, 25.40, of the Baldwins were infected, whereas the greenings showed but 14.27. This is very probably due to variation in the preblossoming spray. A reverse condition obtains in relation to leaf roller, there being 7.74 per cent affected on the Baldwins and 17.44 on the greenings. The average percentage of wormy fruit for the two varieties is almost identical. There is no marked difference in the end wormy, the difference between none on the greenings and but .16 on the Baldwins being so slight that we can hardly attach special significance thereto. There is a little, though not marked, variation in the percentage of side July, "shallow" and side August. In fact, the parallelism is so close that one might conclude that the two varieties were practically equally susceptible to codling moth injury.

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[1] The apples on the ground were included in the tabulation of trees A, D and F, though owing to a misunderstanding this was not possible for the other trees in this orchard.

Barker orchard, checks (unsprayed) 1917

TREE	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY				
					Total	End	Side July	Shallow	Side August
Y	590	100	313	31	319	52	84	156	60
Percent	.....	16.95	53.00	5.25	54.06	8.81	14.23	26.44	10.17
X	1 149	425	377	109	406	96	170	176	81
Per cent	.....	36.99	32.81	9.48	35.33	8.35	14.80	15.32	7.04
Total	1 739	525	690	140	725	148	254	332	141
Per cent	.....	30.18	39.67	8.05	41.69	8.51	14.60	19.10	8.11

The two check or unsprayed trees show a marked contrast to the experimental plots. Attention should first of all be called to the fact that in selecting these trees practical considerations led to the choosing of those with a moderate or small crop and as a consequence the percentage of infested apples would very likely be higher. Nevertheless, there is a marked contrast between the 54.06 per cent of wormy fruit on tree Y with its total yield of 590 apples and 14.64 per cent of wormy fruit on tree E of plot 3 with a yield of only 437 apples. Similarly tree X with its 35.33 per cent of wormy fruit in a total yield of 1149 apples contrasts strongly with the 13.95 per cent of wormy fruit on tree D of plot 1 with its crop of 1139 apples.

The average percentage of wormy apples for the check trees was 41.69 with an average of end wormy of 8.51, of side July of 14.60, shallow 19.10 and side August 8.11 per cent.

Briefly stated, these unsprayed trees show a big increase in the end wormy, the side July and the side August, this being especially true of the former two, whereas the average percentage of shallow affected apples is less than half of the total percentage of wormy fruit. Broadly speaking, were we to take from the total wormy on the check trees the excess percentage of the side July and side August as compared with the sprayed trees we would have approximately the same relative amount of shallow affected fruit on the unsprayed trees as upon those which were sprayed. In other words, these figures support the contention that the spraying of one season has little effect upon the proportion of side or shallow injury of the same year, and that the reduction in the amount of this type of mischief must be brought about largely by the applications of earlier years reducing the total infestation of the orchard. This is one of the strong arguments for systematic annual spraying without regard to the yield.

Barker orchard, summary of plots, 1917

PLOTS	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY				
					Total	End	Side July	Shallow	Side August
1 Total	7 392	3 843	1 343	1 230	1 400	50	305	859	264
Per cent	.....	51.98	18.16	16.63	18.93	.69	4.12	11.62	3.57
2 Total	8 687	5 430	1 510	716	1 405	15	194	1 153	80
Per cent	.....	62.50	17.38	8.24	16.17	.17	2.23	13.27	.92
3 Total	11 015	5 936	3 713	1 098	1 150	24	149	1 027	14
Per cent	.....	53.89	33.71	9.96	10.44	.22	1.35	9.32	.13
Checks									
Total	1 739	525	690	140	725	148	254	332	141
Per cent	.....	30.18	39.67	8.05	41.69	8.51	14.60	19.10	8.11

In a study of the summary of these plots allowance should be made for the fact that there is a progressive increase in yield in plots 1, 2 and 3, though not necessarily because of the increased number of applications. This has a bearing, as pointed out earlier, upon the percentages of infested or infected fruit. There is not a consistent gain in the perfect and an inconsistent increase in the scabby fruit, as compared with plots 2 and 3, due probably to some factor not clearly evident in the experimental work. The same is true, though to a less extent, in regard to leaf roller. The reduction in the total wormy apparently indicates a marked benefit for three applications as compared with one or two, though we are inclined to attribute considerable of this apparent benefit to the decidedly larger crop on plot 3. There is a marked benefit in the reduction of end wormy, side July and side August in both plots 2 and 3, though in the case of the "shallow" the difference is offset in large measure, if not entirely, in the case of plot 3 by the larger yield; in fact there is a little greater proportionate reduction in the percentage of total wormy than in the percentage of "shallows" between plots 2 and 3.

The check trees show a marked contrast to those which were sprayed, there being only about half as much perfect fruit, a considerably higher percentage of scabby apples and a much greater percentage of wormy fruit. The principal benefits of spraying as evidenced by this table lie in the almost complete elimination of end wormy, the great reduction in side July, and side August and when increases in the latter two are eliminated we have nearly the same ratio existing between the total wormy and the "shallows" as in the case of the sprayed plots.

Kendall Orchard

The experiments of the last two years were continued in the greening orchard of Mr H. E. Wellman of Kendall, the plots being practically the same as in 1916, except that the check trees X and Y were in the twenty-third row north from the driveway. The location of the plots is given in detail in the report for 1916 on page 19 and need not be repeated here.

The first application was made June 12th, Dow's arsenate of lead being used at the rate of 2½ pounds to 50 gallons of water and Dow's lime sulphur wash at the rate of 1 to 40. The Friend "spray gun" was employed with a 3 foot extension and a pressure of 200 pounds. The spraying was done entirely from the wagon, and owing to the large size of the trees it was frequently impossible to hold the nozzle at such a distance as to give the most satisfactory results. Furthermore, this first treatment was rendered more difficult by the muddy condition of the orchard, this making it almost impossible to stop the team with any degree of accuracy. The weather conditions were nearly perfect, it being a sunny day with little wind. The western row had been given a semidormant spray of 12 gallons of lime sulphur and three-fourths of a pint of nicotine, while the eastern row was sprayed with nicotine while the buds were in the pink.

The second application was made July 10th to plots 2 and 3, the " spray gun " being used as before. The preceding night it had been raining and the trees did not dry off until 1.30 in the afternoon, at which time spraying began. The apparatus carried easily to the top of the trees though it overdrenched the foliage when the limbs were within a foot or two of the nozzle. The best work was secured at a distance of 6 to 10 feet from the trees and better results could doubtless have been secured if the applications from the platform had been supplemented by a man working from the ground. The foliage showed injury from spray, evidently due to an excessive amount and in August the ground was partly covered with fallen leaves. There were used in the second spray 16 pounds of arsenate of lead to 200 gallons and 5 gallons of lime sulphur wash. Approximately 12 gallons of material were applied to each tree. The work was completed about 3 o'clock in the afternoon with the probability of showers occurring within two hours.

The setting of fruit was so light on plot 3 in particular that it was not considered worth while to give the third spraying early in August. Consequently the following data relates only to the efficacy of one and two applications for the control of codling moth.

The fruit was picked September 27th and classified by the Entomologist and Mr L. J. Steele of the local farm bureau.

Kendall orchard, plot 1 (sprayed once) 1917

TREE	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY			
					Total	End	Side	Shallow
A No.	930	530	98	241	400	7	161	252
Per cent	......	56.08	10.54	25.91	43.01	.08	17.31	27.09
B No.	994	220	243	311	377	20	179	209
Per cent	......	22.13	24.33	31.28	37.92	2.01	18.00	21.02
C No.	770	186	147	165	152	6	61	91
Per cent	......	24.16	19.09	21.42	19.74	.77	7.92	11.81
D No.	1 571	550	268	422	514	36	266	243
Per cent	......	35.17	17.05	26.86	32.71	2.29	16.93	15.46
E No.	340	135	30	108	102	4	46	60
Per cent	......	39.42	8.82	31.76	30.00	1.08	13.53	17.64
F No.	232	59	52	72	86	5	54	33
Per cent	......	25.43	22.41	31.03	37.07	2.15	23.27	14.22
Total	4 837	1 680	838	1 319	1 631	78	767	888
Per cent	......	34.71	17.32	27.26	33.71	1.61	15.85	18.35

It will be seen from the above tabulation that the yield on plot 1 was light, it ranging per tree from 232 apples to 1571. Approximately one-third of this, 34.71 per cent, was perfect fruit, while 17.32 per cent were affected by scab and 27.26 per cent showed the work of the leaf roller. The percentage of wormy apples was high, it ranging for individual trees from 19.74 to 43.01 and under the conditions obtaining when the first and more important application was made this is perhaps not surprising. The high percentage of wormy fruit is reflected in the end wormy, this amounting in the case of three trees to over 2 per cent and averaging for the plot 1.61 per cent. There was a large amount of side injury, this varying for individual trees from 7.92 to 23.27 per cent. There was also a moderate though not excessive percentage of " shallow " affected apples, this varying for individual trees from 11.81 to 27.09, the average for the plot being 18.35 per cent.

Kendall orchard, plot 2 (sprayed twice) 1917

TREE	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY			
					Total	End	Side	Shallow
A No.	743	300	145	141	212	19	84	123
Per cent	......	40.37	19.51	18.97	28.53	2.55	11.30	16.55
B No.	258	80	32	85	85	8	32	50
Per cent	......	31.00	12.46	32.94	32.94	3.10	12.40	19.37
C No.	825	385	87	201	205	23	58	135
Per cent	......	46.67	10.55	24.36	24.84	2.78	7.03	16.36
F[1] No.	189	60	44	57	45	7	14	25
Per cent	......	31.74	23.20	30.15	23.81	3.70	7.40	13.22
Total	2015	825	308	484	547	57	188	333
Per cent	......	40.94	15.28	24.02	27.14	2.83	9.36	16.52

The yield for plot 2 was markedly less than that for plot 1, two trees producing no apples and the others with an average considerably less than in plot 1. There is a higher percentage of perfect fruit, 40.94 per cent, and a lower percentage of scabby apples, 15.28 per cent, the latter probably due to the second application. There was also less injury by leaf roller and a reduction in the percentage of wormy apples, this averaging for the plot 27.14, individual trees varying from 23.81 to 32.94. There was a higher percentage of end wormy, a decidedly lower percentage of side wormy, and a slightly less percentage of " shallow " affected apples as compared with plot 1.

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[1] Trees D and E bore no crop.

Kendall orchard, checks (unsprayed) 1917

TREE	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY			
					Total	End	Side	Shallow
X............	537	115	152	20	304	119	195	86
(*Baldwins*)........	......	21.41	28.30	3.74	56.61	22.16	36.31	16.01
Y............	399	48	124	52	264	141	181	50
(*Greenings*)........	......	12.03	31.07	13.05	66.16	35.33	45 36	12.55
Total.........	936	163	276	72	568	260	376	136
Per cent......	......	17.41	29.48	7.69	60.68	27.77	40.17	14.53

The two check trees produced on an average nearly as many apples as those in plot 2 and yet there were only 17.41 per cent of perfect fruit, 29.48 per cent being affected by scab and 7.69 per cent damaged by leaf roller. A very marked difference in wormy apples is noticeable, the percentage for the two trees being 56.61 and 66.16 with an average of 60.68. The end wormy constituted 22.16 and 35.33 per cent, respectively, with an average of 27.77, while the side wormy ran up to 36.31 and 45.36 per cent, the average being 40.17 per cent. There were, however, relatively few " shallow " affected apples, these amounting on the two trees to 16.01 and 12.55 per cent, respectively, giving an average for the two of 14.53. The marked contrasts are too evident to require further emphasis.

Kendall orchard, summary of plots, 1917

PLOTS	TOTAL FRUIT	PERFECT	SCAB	LEAF ROLLER	CODLING MOTH, WORMY			
					Total	End	Side	Shallow
1 Total..........	4 837	1 680	838	1 319	1 631	78	767	888
Per cent........	......	34.71	17.32	27.26	33.71	1.61	15.85	18.35
2 Total..........	2 015	825	308	484	547	57	188	333
Per cent........	......	40.94	15.28	24.02	27.14	2.83	9.36	16.52
Checks								
Total.........	936	163	276	72	568	260	376	136
Per cent.......	......	17.41	29.48	7.69	60.68	27.77	40.17	14.53

The summary tabulation given above brings out in a general way the results obtained in this orchard, and it is a source of regret that the crop was not larger and more uniform so that comparisons would have been of greater value. It will be seen that in plot 2, although the trees bore distinctly lighter crops than plot 1, there were relatively more perfect apples, while there was a much higher percentage of scab on the check or unsprayed trees. The vagaries in the leaf roller injury are shown by the fact that the unsprayed trees show less injury of this character than the others.

Taking the check trees as a standard, it will be noted that the infestation which apparently was very heavy was cut down nearly one-half by the first application and lessened to only a relatively slight extent by the second spraying, though these figures can not be compared strictly, owing to the lighter crop on plot 2 tending to increase, to some extent at least, the percentage of infestation. The increase in end wormy between plots 1 and 2 should be regarded as accidental or attributed in large measure to the small crop on plot 2, and these compared with the very high percentage of end wormy on the check trees, since this latter shows where the major benefit from spraying is secured. There is a marked, though by no means such a great gain in the side wormy. It should be noted that there is comparatively little variation in the percentage of "shallow" affected apples on plots 1, 2 and the checks, indicating that spraying has comparatively little effect, at least the season it is applied, upon this type of injury.

Miscellaneous Field Notes

The personal interest of Mr L. F. Strickland, agent of the State Department of Farms and Markets, has resulted in the securing of certain data which are here placed on record. He measured 9 apples at the time codling moth deposition began and found a range from 1½ to 2 inches or an average diameter of approximately 1⅞ inches. The variation in oviposition and the development of the larvae, due in part to the advance of the season and probably also to local conditions, is strikingly shown by the following records.

In the orchard of Charles Hoag, Gasport, July 26th, 9 entrances and 1 egg shell were found on 104 apples examined in sequence. The trees were well loaded with fruit.

August 4th, a similar examination in the orchard of Mr G. H. Williams, Newfane, of 56 apples, resulted in finding 49 entrances and 8 egg shells; 5 of these apples had 2 entrances each and 2 had 3 entrances each. Mr Williams's orchard was practically without a crop and though the counts were made on trees bearing a fair number of apples, it is possible that there was some concentration of the insects upon the fruiting trees, though this hardly accords with experiences in experimental orchards during the past decade, which latter appears to show comparatively little migration from tree to tree.

Codling moth data from various orchards, 1917 (L. F. Strickland)

ORCHARD	PICKED FRUIT						DROPPED FRUIT					
	Total apples	Total wormy	Shallow	Deep	August	End	Total apples	Total wormy	Shallow	Deep	August	End
W. W. Dutton, Youngstown												
(Tree 3)...........	1 087	249	392	36	4	....	25	20	16	16	.	
(Tree 5)...........	1 702	324	440	149	3	....	17	8	2	10	.	.
S. F. Burton, Ransomville												
(Tree 16)..........	1 054	263	347	67	44	1	51	40	21	39	....	1
(Tree 17)..........	1 623	301	377	73	34	2	30	26	13	28	....	1
R. E. Heard, Lockport												
(Tree 1)...........	386	117	180	22	13	....	8	6	....	6	.	...
(Tree 2)...........	1 117	475	838	196	56	1	120	103	58	89	. .	..
G. E. Manning, Ransomville												
(Tree 4)...........	3 426	1 050	1 300	234	94	3	72	50	11	49	....	7
(Tree 9)...........	2 049	774	1 044	188	45	9	60	44	9	33	1	9

It will be noted on referring to the above tabulation that the number of " shallow " affected apples invariably exceeds the total wormy, except in the case of the dropped fruit. The average number of " shallows " to each wormy apple is approximately 1½, though in the case of tree 2 of the Lockport orchard there are nearly 2. In this tabulation every codling moth injury was counted, and since from 1 to 5 or even 6 " shallows " may occur upon a single fruit, it is easy to understand how the number of such blemishes may easily outrun the number of apples affected. It is evident from these data that only a comparatively small proportion of the young caterpillars entering the side of the fruit penetrate to any depth, and on referring to data given elsewhere it will be seen that the same is true of unsprayed as well as of sprayed trees.

Summary and Conclusions

The experience of the last three years in western New York leads us to emphasize the necessity of thorough work, especially with the spraying given just after the blossoms fall and widely known as the calyx spray or codling moth spray. This is the treatment which gives by far the largest returns in preventing wormy apples. In our opinion a deficient or poor spraying at this time can not be made good by later treatments, though the latter are undoubtedly helpful. The equipment should be such that the trees could be thoroughly and quickly covered with the spray and the men doing the work should have a full appreciation of the difficulties and the possibilities. The last is by no means an insignificant factor in securing thorough work. A liberal application should be made at this time and the aim should be to fill every calyx cup with poison, since it is at this point that most of the killing occurs. The second application for the codling moth may be effective in reducing " side injury " or " shallow " affected fruit to some extent, though conditions the past two seasons would indicate no very marked gain in this respect and a comparison of percentages between the different plots shows a remarkable consistency in the proportion of " shallow " affected apples between the sprayed and the unsprayed trees. The elimination of this type of injury, we believe, as stated last year, must depend very largely upon the treatment of the preceding season; in other words, the clean orchard kept clean by thorough and systematic spraying year after year will suffer very much less from injury of this kind.

The light crop of the past season has emphasized very strongly the effect a scanty yield may have upon the proportion of wormy apples, percentages running considerably higher than in the two preceding years. The high prices realized for fruit is an additional incentive for thorough spraying.

Evening temperatures have a decided effect upon the periodicity of oviposition, though the climatic and other conditions were unfavorable the past season, as well as the preceding, for the obtaining of any sharply defined data. The conclusions of last year are borne out by the records obtained the past season.

Both the second and third sprayings for the codling moth, even if they have comparatively little influence in reducing the numbers of this pest, are abundantly justified in localities or during seasons when scab is more or less prevalent, assuming of course that a fungicide is universally added to the poisoned spray.

There was no such widespread injury to foliage as a result of spraying the past season as obtained the preceding year, though in a few instances a perceptible amount of burning was traceable to overloading the leaves with a spray which under normal conditions would be harmless. Forcible, moderately strong applications can not be driven upon the leaves without danger of burning. There should be a distance of 6 to 8 feet, in some cases possibly more, between the nozzle and the foliage.

APPLE AND THORN SKELETONIZER

Hemerophila pariana Clerck

Another introduced apple insect has become well established in Westchester and Rockland counties, the center of the infestation being near Irvington and Nyack, respectively. It is a small European moth which we have termed the apple and thorn skeletonizer. It is classed as one of the apple insects of minor importance in Europe though this may not necessarily prove to be the case in America,

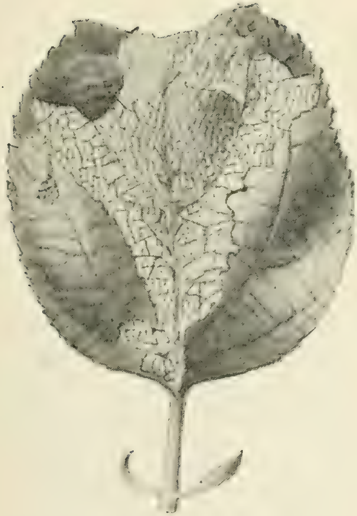

Fig. 1 Apple and thorn skeletonizer, characteristic work on partly eaten leaf. (Author's illustration)

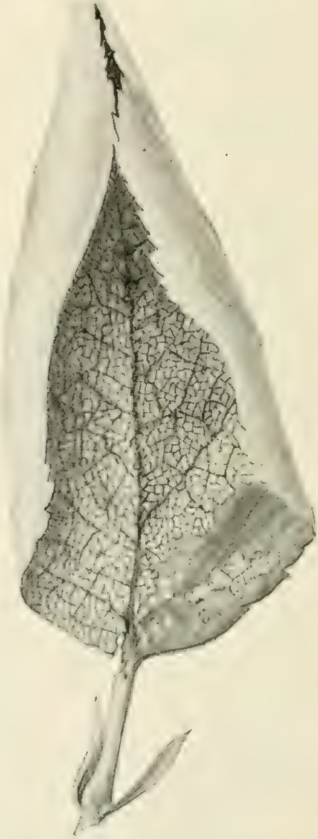

Fig. 2 Apple and thorn skeletonizer, nearly skeletonized apple leaf showing the somewhat characteristic folding over or curling of the edges. (Author's illustration)

since some of our most destructive introduced species are of relatively slight importance in their native countries. The caterpillars feed upon the upper surface of the leaves almost entirely and it is, therefore, relatively easy to apply poison where it will do the most good. This considerably simplifies the problem of control and renders it fairly easy to keep this pest within bounds until its status can be determined or natural enemies have an opportunity to assert themselves and prevent widespread and material damage. The insect is already sufficiently numerous near the center of the infested area to defoliate entire orchards and conditions favor a continuation of the spread with its accompanying serious injury unless there is early, thorough and general spraying in the infested area next summer.

Recognition characters. This pest skeletonizes apple leaves in much the same way as the well-known canker worms, except that these latter more usually devour all the vital tissues of nearly every leaf, whereas this newly introduced caterpillar generally confines its attack to portions of many leaves (frequently practically all the leaves on a tree may be eaten in this manner), feeding near the center under a slight web and extending upward and outward to include most of the tip of the leaf as illustrated in figure 1. Areas on each side of the basal part of the leaf are often untouched. Frequently the margins to the width of one-half of an inch or so are turned over and a badly eaten leaf may present the appearance illustrated in figure 2. There is no webbing together and inclosing leaves in masses so characteristic of the native fall web worm and also seen to a less extent in the nests of the brown tail moth caterpillar. Both of these last-named species produce moderately firm to thick webs which inclose the leaves, something never done by this newly introduced insect. Moreover, the caterpillar of the apple and thorn skeletonizer is active, yellowish, black-spotted, practically naked and about half an inch long, whereas both of the above-mentioned tent-making caterpillars are distinctly hairy, slower in movement and, when full grown, an inch or more in length.

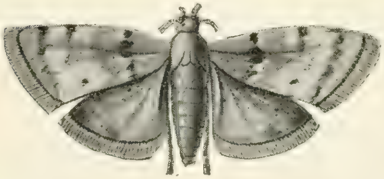

Fig. 3 Apple and thorn skeletonizer, an unusually well marked moth. The coloration varies greatly. (X 4) (Author's illustration)

Description. The moth (figure 3) is an obscure grayish brown or dark brown, sometimes purplish tinged, insect with a wing spread of a little less than one-half of an inch. The antennae are long, slender and dark brown with numerous fine white annulations. The palpi are moderately prominent and mottled with yellowish and dark brown scales. The head is mostly purplish brown shading to yellowish brown above the mouth. The thorax is thickly covered with dark brown scales with a variable mottling of yellowish brown, the abdomen being a little darker. There is in well-marked specimens near the base of the forewing a rather broad, broken, angulate darker band near the basal third and a less distinct and more regular but somewhat broken dark band near the distal fifth, an area between this and the basal third being a variable grayish with one or more dark spots near the costal margin. The hind wings are dark fuscous and both fore and hind wings are margined with rich purplish brown scales.

Pupa (figure 4). Length about one-fourth of an inch, moderately stout and dark bronzy yellow, variably marked with fuscous, especially on the posterior abdominal segments. The head is dark brown with a few fine, moderately long hairs. Antennal cases slender, the variably yellow mottled wing cases extending to the sixth abdominal segment, the leg cases reaching just a little beyond. The mouth-parts and most of the median ventral area between the antennal cases yellowish. The dorsum of the thorax dark bronzy yellow. Scutellum fuscous yellowish and with a very fine short pubescence. Dorsum of the abdominal segments moderately smooth, shiny, the segments when flexed ventrally showing along the anterior margin series of minute closely set teeth. Terminal segment yellowish.

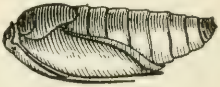

Fig. 4 Apple and thorn skeletonizer, side view of pupa. (X 6) (Author's illustration)

Cocoon (figure 5). The cocoon is spun upon the upper surface of the leaf and consists of an elongate oval mass of thick white webbing about five-eighths of an inch long and one-fourth of an inch wide. It is frequently near the midrib and covers the true cocoon, which is faintly seen beneath. The pupa wriggles out partly from under the webbing before the moth escapes, the pupal shell projecting as in the sesiids.

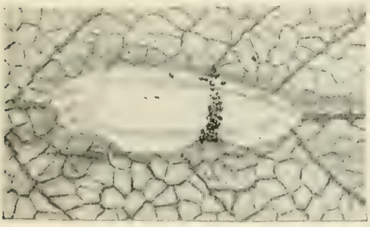

Fig. 5 Apple and thorn skeletonizer, cocoon on leaf, the true cocoon is partly revealed through its covering of webbed silk. (X 2) (Author's illustration)

Larva. The caterpillars (figure 6) are quite variable in appearance. The smallest observed on the leaves were about one-eighth of an inch long, mostly pale greenish yellow. The head is a distinct amber shade with a rather conspicuous dark-brown group of closely placed ocelli. There is a narrow, irregular, dark-brown line at the lateral dorsal angles of the head case, a small, black, fuscous spot ventrally and a pair of small, subtriangular, black spots sublaterally. Antennae moderately prominent, mostly yellowish brown, slightly fuscous apically. Thoracic and abdominal segments mostly a uniform yellowish, the true legs pale yellowish and having the second segment fuscous and the distal segment much more slender, tapering and with a distinct claw apically. There are well-developed cylindrical abdominal segments, each leg when extended with a length approximately three times its diameter. The tubercles are a pale fuscous or fuscous, depending on the age of the caterpillar, each bearing one or two moderately long hairs.

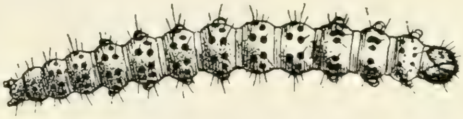

Fig. 6 Apple and thorn skeletonizer, dorsal or top view of a typical pale greenish caterpillar. The spots on this specimen are about the average size. (X 6) (Author's illustration)

Older larvae with a length of about three-sixteenths of an inch are decidedly darker, though the general color is practically the same. The tubercles are much larger and in some specimens almost confluent, so as to give the appearance of submedian black lines, though in reality they are simply series of closely set tubercles. The thoracic legs have a shade of fuscous on the apical portion of the basal segment, the second segment is black and the third practically as in the earlier stage.

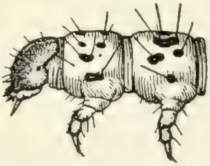

Fig. 7 Apple and thorn skeletonizer, head and first two body segments of the caterpillar, showing the arrangement of the warts or tubercles and the structure of the legs. (X 10) (Author's illustration)

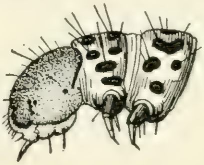

Fig. 8 Apple and thorn skeletonizer, side view of a smaller, darker caterpillar. Note the relative size of the black warts or tubercles. (X 12) (Author's illustration)

Full-grown caterpillars have a length of nearly one-half of an inch and present practically the same characteristics as given above, there being some darker specimens with rather larger black tubercles and lighter ones with somewhat smaller tubercles (figures 7 and 8).

Distribution. This species is probably widely distributed, since it has been recorded from England, France, Germany, the Balkan Peninsula, Bithynia and west in Asia to Turkestan. The range suggests that the insect can maintain itself over most of the United States and southern Canada.

This apple pest has become established in New York State in an area, determined in cooperation with Dr G. G. Atwood of the State Department of Farms and Markets, as centering approximately upon Ardsley and Irvington, extending east to White Plains and possibly Mount Kisco, south to Harrison and north to Croton. It also occurs on the west bank of the Hudson river, ranging for a mile or two north and south of Nyack and west to West Nyack. Apparently there is less injury on the west bank of the Hudson, suggesting that the species obtained its foothold on the east bank and from there has been gradually spreading. The probabilities are against the rapid dissemination of this insect, though we have no definite information as to just how long it has been established in this country.

Life history. It has not been possible to work out the complete life history of this insect under American conditions, though there is no reason for thinking that the moth has departed materially from its habits as recorded in Europe. Mr J. W. Tutt states that adults occur in September and October on flowers of Compositae while William West records capturing specimens among goldenrod.

The moths and probably pupae hibernate, the former in any shelter such as thatch and the latter in cocoons attached to leaves. The overwintered moths or those issuing from pupae deposit eggs probably when the leaves are partly developed, since Meyrick records larvae as occurring in England during May, June and August. Messrs Gelin and Lucas report them in France in April and September and Rouast in August and September, while Grund records them in Bohemia during June and July and Doctor Reh in Germany during spring and late summer, these data indicating at least two and probably three generations annually. There is considerable variation in development toward the end of the season, at least under American conditions. Full-grown and very small larvae were found simultaneously at Irvington in September and even in early October, a few larvae feeding to the latter part of the month. Larval growth is probably completed within four to six weeks. The type of injury suggests that the moths deposit a few eggs near the base of each leaf and when numerous may oviposit on almost every leaf. One of the striking features of an infestation is the general distribution of partly injured leaves throughout the tree or even the entire orchard.

The feeding on each leaf is, practically speaking, independent of that upon other leaves. There is no inclosing and webbing them together as with the fall web worm. The small caterpillars feed almost entirely upon the upper surface, skeletonizing the leaves more or less completely and working from the lower part of the midrib upward and outward so that, unless the infestation is unusually severe, areas on each side of the basal parts of the leaf frequently remain untouched, as illustrated in figure 1, a type of injury characteristic of moderately infested orchards. Those badly infested may have practically every leaf on all the trees completely skeletonized, as shown in figure 2.

Food plants. This insect shows a marked preference for apple though it has also been recorded by European writers as feeding upon pear, hawthorn, mountain ash, birch and possibly willow.

Natural enemies. Meyrick's statement to the effect that this skeletonizer is local in England indicates moderately efficient natural enemies, and this is borne out by its classification as a pest of minor importance by Continental writers. Doctor Reh gives the following list of parasites: Angitia glabricula Holmgr., Mesochorus pectoralis Rag., Microgaster species, Phygadeuon and Thryptocera crassicornis Meign. It is possible and certainly to be hoped that some of its native enemies have become established with their host. If this is not the case the chances favor certain of our native parasites becoming accustomed to this new food supply and assisting materially in reducing its abundance. One parasite, Dioctes obliteratus Cresson, kindly determined by Mr Gahan through the courtesy of Dr L. O. Howard, has already been reared from material received from Westchester county.

Control measures. There is no question but what thorough and timely spraying with a poison, such as arsenate of lead, will destroy the caterpillars and, owing to their feeding almost entirely upon the upper surface of the leaves, a general application of these measures in infested areas to all trees upon which the pest can subsist would mean its early control and practical elimination so far as material damage is concerned. Furthermore, the adoption of such measures would be a most effective check upon a rapid spread and consequent extensive injury. Residents of the infested section are most strongly advised to watch for the development of the insect next season and to spray with an arsenical poison all trees showing signs of its work, since it is very important to control it so far as possible because experience has demonstrated that it is easier to handle an outbreak in its incipiency than to begin after serious losses have occurred.

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POTATO APHIS

Macrosiphum solanifolii Ashm.

The season of 1917 was remarkable for a widespread outbreak of potato aphids, mostly the above-mentioned species, though the green peach aphis, Myzus persicae Sulz., may have been associated in the destructive work. It is quite probable that this unexpected outbreak was due to climatic peculiarities, particularly as this insect is known as a somewhat destructive species in the cooler, presumably normally moister climate of Maine.

Injuries in the State. Reports of aphids killing potato plants were received about mid July from Long Island and this was soon followed by other records of infestation, the most serious damage being in the southern part of the State, though the insect was noted here and there in other sections, being abundant and somewhat injurious in Ulster county though causing comparatively little mischief in the western part of the State.

A general idea of the situation may be gathered from the following extracts from reports received from all parts of the State.

Albany county. Fifty per cent of the fields about Ravena were reported as infested though the damage was not serious.

Chautauqua county. Aphids were quite prevalent in some fields about Jamestown and Sheridan, though injury was not considered serious. It was reported scarce in the vicinity of Fredonia.

Columbia county. The insect was reported abundant in the vicinity of Hudson though gradually disappearing during the second week in August.

Dutchess county. The pest was in some cases so prevalent as to cause alarm and the infestation was sufficiently general as to reduce the crop more than 5 per cent.

Fulton county. Aphids were very common though not causing serious damage. Forty to 50 per cent of the fields in Johnstown, 40 per cent of those in Broadalbin and 20 per cent in Ephratah were estimated as infested and for the entire county a general estimate was 25 per cent with a decrease in crop of approximately 3 to 5 per cent.

Genesee county. There was an infestation with injury to early varieties though it was not generally recognized and the difficulty attributed, in some cases, at least, to blight.

Greene county. Aphids were reported as present in small numbers.

Jefferson county. The insect was reported though not abundant. Aphids were present in some sections though not seriously injurious.

Lewis county. Conditions nearly as in Jefferson county, the insects disappearing mostly during the second week in August.

Livingston county. Aphids were reported more than usually abundant.

Monroe county. The pests were generally present and some fields were seriously infested, though the loss in the county was not large in the aggregate.

Nassau county. In mid July aphids were reported as killing potatoes in many localities and becoming dangerously abundant on tomatoes. The latter part of the month parasites were very numerous and practically controlling the insect, which disappeared before mid August.

Niagara county. Generally distributed and serious in some places, the insects leaving the potatoes about August 20th.

Oneida county. Aphids were reported as quite prevalent in unsprayed fields.

Ontario county. Generally present though not injurious.

Orange county. The pests were numerous in many small backyard patches and in a few larger fields. In early July and the latter part of the month they were so numerous as to be practically a plague. The insects disappeared during the second week of August.

Oswego county. About 90 per cent of the fields were infested though the insects were not present in sufficient numbers to cause serious damage.

Rockland county. Aphids were reported very injurious and abundant, ruining probably 50 acres.

Schuyler county. It was estimated that 50 per cent of the fields in the county were infested but most of them were not seriously affected.

Suffolk county. The infestation was placed at 100 per cent and in the town of Riverhead 10 per cent of the fields were probably seriously damaged, though Professor Sirrine expresses the opinion that the aphids by destroying the flower stalks may not be entirely injurious. Mr Latham of Orient places the decrease in the crop at 10 per cent and the last of July reported that from one-half to two-thirds of the insects were infested by parasites.

Ulster county. Aphids were generally prevalent in the county, some 12 per cent of the fields being infested and the insects causing an estimated decrease of the crop placed at 10 to 75 per cent. In a few cases entire fields were destroyed. The percentage of infested fields in various towns ranged from 18 to 80 and the per cent seriously affected from 6 to 60. The insects appeared first July 10th and caused the greatest damage July 21st, beginning to disappear on the 23d.

Washington county. It was estimated that 5 per cent of the fields were infested with a 5 per cent decrease in the crop.

Habits and life history. This aphid, like the well-known apple species, winters as a shiny black egg and more frequently on the rose than any other host. With the coming of warm weather these hatch and some of the winged individuals fly to potatoes and start colonies. The young become full grown in about ten days, thus making possible the production of many generations during a season. Messrs Houser, Guiton and Lowry[1] have estimated that the total progeny and offspring of on for a period of two weeks may amount to 76 aphids. They found on one small potato plant having only seven leaves 1237 aphids and on a large spreading plant with twelve stalks 34,688 plant lice and another large one had 25,750 aphids. The rate of reproduction is such that it would require only two weeks for 456 producing females to colonize the most seriously infested of these plants. With these figures in mind it is not surprising that an aphid outbreak may develop rapidly and become extremely destructive almost before the presence of the pests is suspected.

This aphid breeds freely upon potato, tomato, egg plant, pepper and sunflower and may be found commonly, though not in large numbers, upon such well-known plants as jimson weeds, ragweed, lamb's quarters, sweet potato, canna, hollyhock and matrimony vine. It also occurs, though less commonly, upon a number of other plants so that it is comparatively easy for this aphid to maintain itself in any locality where climatic conditions are suitable.

Characteristics of outbreak. The plant lice attack the tender young leaves, causing the edges to turn downward and after a short time the foliage shrivels and we have a characteristic dying condition. This progresses from the top downward and in very seriously infested fields all the foliage may speedily succumb, part of this being very likely due to plant diseases as well as to insect injury.

The tomato is also very liable to infestation, the aphids first working on the under side of the leaves, causing them to curl, and also becoming very abundant upon the tender terminal portion of the stalk and the blossom stems. A serious infestation results in the bloom dropping without the setting of fruit, and as this occurs upon the earlier blossoms the loss is frequently very considerable. Egg plants and peppers are also severely affected by this pest, the aphids working as in the case of the tomato, on the under side of the leaves and the greatest injury resulting, as in the case of the tomato, from the attack upon the blossom and the blossom stem.

Natural enemies. The potato aphid, like other plant lice, is very subject to attack by various natural enemies, especially minute four-winged parasites and the black spiny grubs and adults of the lady beetles. The presence of parasites in an infested field is easily determined by the enlarged and characteristically swollen brown dead aphids, frequently with a circular hole in the empty skin. Lady beetles and their grubs are so well known that further description is unnecessary. The presence of considerable numbers of aphids killed by parasites or an abundance of lady beetles and their grubs is an indication that natural enemies are likely to reduce the infestation very shortly, especially if the weather is moderately warm to hot. Recognition of this condition is of practical importance, because it has a bearing upon the advisability of spraying, since applications for the destruction of the insects are of comparatively little service if most of them have been killed or are being rapidly destroyed by beneficial insects.

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[1] Ohio Agricultural Experiment Station Bulletin 317, 1917.

Remedial measures. The experience of last season has demonstrated the efficacy of the nicotine soap preparation, using three-quarters of a pint (40 per cent nicotine) to 100 gallons of water, to which are added 6 to 8 pounds of any cheap soap. The one essential is to spray thoroughly and particularly from the under side so as to drench all the insects. Early treatment repeated several times at three day intervals will prevent serious damage. It is important to do this early and thus prevent a serious check to the growing plants.

NOTES FOR THE YEAR

There have been comparatively few complaints of injury to trees by leaf-eating insects. The cool, wet conditions prevailing in spring and early summer promoted plant growth and were unfavorable to the development of insect life. There were many localities where the elm leaf beetle, Galerucella luteola Mull., though seriously injurious in earlier years, hardly damaged the trees.

The comparative scarcity of early leaf feeders was a marked contrast to the unusual abundance of late-appearing caterpillars, such as the hickory tussock moth, Halisidota caryae Harr., the oak tussock caterpillar, H. maculata Harr., and the pale tussock caterpillar, H. tessellaris Sm. and Abb., these being particularly numerous and causing considerable apprehension, not only in regard to immediate injuries but also as to developments in the future. The fall web worm, Hyphantria textor Harr., was generally present and somewhat destructive. The abundance of other late leaf feeders on fruit trees is noticed below. There are also notes under appropriate heads relating to some of the more injurious species.

FRUIT TREE INSECTS

Gipsy moth (Porthetria dispar Linn.). An examination June 22, 1917 at Mount Kisco of an area where a gipsy moth infestation was discovered some five years ago revealed a very satisfactory state of affairs. The insect had spread over approximately 175 acres on two large estates. During the past summer we were informed no caterpillars or living gipsy moth in any stages were found. Nevertheless, the entire infested area was thoroughly sprayed with arsenate of lead, using 10 pounds to 100 gallons of water, the application being made with one of the modern high-power spraying outfits generally employed for woodland work in eastern Massachusetts. The general indications are that the colony, although larger than the earlier discovered one at Geneva, has like that been exterminated.

Yellow-necked apple worm (Datana ministra Drury). This common leaf feeder, easily recognized by the conspicuous yellow mark just back of the head in connection with a scant hairiness and its black and yellow stripes, appeared in orchards the latter part of August or early in September and was reported from numerous localities throughout the State. The gregarious habits of these pests result in branches or even entire trees being rapidly defoliated, and as a consequence considerable injury is very probable on young trees.

This pest is easily controlled by crushing the small colonies of caterpillars before they have had an opportunity of causing much injury, or general protection may be secured against this and other leaf feeders by spraying about the middle or the latter part of August with arsenate of lead or similar poison applied at the usual strength.

Red-humped apple worm (Schizura concinna Sm. and Abb.). Colonies of this late leaf feeder began to appear in New York orchards about mid July and continued feeding through that month, August, September and even into October. These pests, like the yellow-necked apple tree worm, are gregarious in habit and consequently branches or young trees are very likely to be defoliated. This red-humped caterpillar is most easily recognized by the red head and the red humps just a little back of the head and near the posterior extremity. The full-grown caterpillars are about 1½ inches long. This insect was unusually abundant and destructive in many orchards throughout the State and occasioned considerable apprehension on account of its depredations. The pest is easily controlled by the same measures as advised above for the yellow-necked apple worm.

Slug caterpillars. These peculiar, apparently legless caterpillars attracted an unusual amount of attention. This was especially true of the caterpillar of the hag moth, Phobetron pithecium Sm. and Abb., a brownish sluglike form about three-quarters of an inch long and with from a few to ten long, plumelike processes extending from either side of the back. It occurs from July to September feeding on the foliage of a number of trees and invariably attracts notice because of its striking appearance.

The saddleback caterpillar, Sibine stimulea Clem., was also relatively abundant. It is a rich brownish caterpillar about 1 inch long when full grown and so colored that it appears as though it wore a green saddle cloth and brownish saddle, the latter margined with white and edged with black, hence the common name. Both the anterior and posterior extremities are adorned with long, brown, spined tubercles. This caterpillar as well as the hag moth caterpillar, is an urticating or stinging form and is capable, if handled incautiously, of inflicting a severe sting. Both have been recorded as feeding upon the foliage of a variety of trees and shrubs, oaks and cherry being preferred, though the saddle back is sometimes rather abundant upon corn. Neither are numerous enough, as a rule, to warrant the advising of remedial measures, such as spraying with a poison.

Oriental peach moth (Laspeyresia molesta Busck). Wilting leaves and bored terminals of peach in late summer may be the work of this insect, a species also known to attack quince, apple and pear. The probabilities are that it breeds equally well in the various cultivated pome and stone fruits. It is especially fond of quince, thirty larvae having been found in one fruit, according to Doctor Quaintance.

This serious pest appears to have become established in New York State. It was first brought to notice late in 1916 by Messrs Quaintance and Wood,[1] who characterized it then as an important insect enemy of the peach. Subsequent information kindly placed at our disposal by Professor Quaintance indicates the occurrence of the insect more or less generally over a radius of 10 or 12 miles from Washington and extending northeastward to Baltimore. There is another center in the vicinity of Rutherford, N. J., and it may also occur at New Brunswick in that state. He adds that the insect is probably generally present over most of Long Island and occurs more or less generally through the parks in New York City.

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[1] Journal of Agricultural Research, 7:373–77, 1916.

Specimens of this borer's work have also been received from Stamford, Conn., indicating a probable extension from New York northeastward along the sound.

The insect, in case of a serious infestation of peach, bores into practically every tender twig and causes new shoots to push out from the lateral buds. These are attacked in turn, resulting in the lateral growth producing a much branched and bushy stand. A copious flow of gum from the twig ends often follows the attacks of the caterpillars. The pest also attacks the fruit, the young caterpillars generally eating through the skin at or near the point of attachment of the fruit stem, making its way to the pit as it grows. Those entering at the side of the fruit are more likely to eat out pockets or cavities in the flesh.

This pest winters as a full-grown caterpillar in a whitish silken cocoon spun in some protected place on the twigs, in cracks under the bark scales on the trunk and branches and even in the soil debris. The moths emerge and egg laying commences at the time the shoots are well started, since larvae are to be found when the sprouts are 6 or 8 inches long. There appear to be two and probably three broods each year, larvae of various sizes being found late in the fall.

Apple maggot (Rhagoletis pomonella Walsh). Injuries by the apple maggot have been less marked in 1917 than was the case during the two preceding seasons. There was in 1916 a very serious infestation in the orchard of Edward Van Alstyne of Kinderhook, there being at least one tree with 100 per cent of the fruit infested.

The experimental work of 1916 was continued and on the appearance of the flies July 16th the orchard was thoroughly sprayed three days later, namely, the 19th, with arsenate of lead at the rate of 3 pounds of paste to 50 gallons of water, to which a tobacco extract was added (black leaf 40, three-fourths of a pint to 100 gallons) and a standard lime sulphur wash, 1 to 36. The application was at least fairly thorough, both the leaves and fruit being well spotted with the insecticide. Only three flies were observed the day following on examining eight or ten trees, while three days preceding a similar examination disclosed an average of less than 1 upon 7 or 8 other trees, two being noted upon one.

An examination August 20th showed very few flies either on the early apples or the winter varieties. Two or three were about all that could be seen to each tree and an examination of the fruit indicated much less injury than was the case a year ago. The same was true also of nearby winter apples, Baldwins and greenings being examined in particular. These observations were fully borne out by the condition of the fruit at picking time, it being much freer from infestation than was the case in 1916.

Pear thrips (Taeniothrips pyri Daniel). This insidious and perplexing pest continues abundant and locally injurious in the Germantown fruit section and also in the pear-growing region about and especially west and south of Poughkeepsie. Reports from other parts of the State indicate comparatively little damage from this insect.

The practical difficulties of controlling pear thrips are indicated by the following: An examination April 23, 1917 of the orchard of C. H. Deuell & Son, Bangall, showed that many of the blossom buds had expanded to a length of one-half of an inch or so and had been or were being invaded by many thrips. This was true not only of a small orchard back of the barn where the infestation of earlier years was most serious and the spraying of the preceding season less satisfactory, but also of the orchard just beyond the creek where the treatment the preceding spring with a thick lime sulphur wash was as nearly perfect as could be expected under practical conditions and where there were hopes that the numbers of the pest would be considerably decreased as a result of the treatment, particularly as observations in May and early June of last year showed that a considerable portion of the crop escaped injury and the presence of a relatively small number of thrips.

It was found last April that individual buds in the orchard beyond the creek had been invaded by two, three, five or six and in a few cases fifteen or twenty of the insects. Those attacked by the larger numbers were in a sticky condition and showed considerable dead tissue, especially in spots here and there. Such blossoms will probably develop no fruit. The spraying with a thick lime sulphur wash was then in progress and while a few insects were killed on the outside of infested blossoms, a considerable proportion, three-fourths to seven-eighths approximately, escaped injury and would presumably be unaffected. There were some trees in the orchard near the barn which had been sprayed on the afternoon of April 20th and these blossom buds showed much less injury; the few thrips found in them had evidently entered within the last day or two. These conditions indicated a much greater degree of protection from the spraying given on the 20th than that which would be secured from an application on the 23d. Mr Deuell stated that very few insects were seen on the earlier date and that stormy weather prevented spraying on the morning of the 21st and evidently nothing was done until Monday, the 23d, at which time conditions were such that spraying could not be advised.

The main difficulty in the control of this insect, as is evidenced by the above, is to make the application at the time it will be most effective, since there is no question but that thorough spraying with a nicotine soap preparation will destroy the thrips, provided they have not sheltered among the partly opened blossoms. The early spraying just before the buds start or " crack " is perhaps the best of all and it is certain that a considerable degree of protection can be obtained from the dormant lime sulphur application containing 60 to 80 pounds of lime, provided the spraying is done before the buds have opened sufficiently to permit the thrips to enter. Treatment should be delayed as late as possible in order to secure maximum results. There is a very close time limit and the successful execution of this method requires preparation beforehand and quick treatment, something that is not always possible under present conditions.

There is some evidence to justify the belief that repeated sprayings in an infested area result in a general betterment, though this may not be very marked in any one season.

Red bugs. There are two very similar species, namely, the dark-red bug, Heterocordylus malinus Reut. and the bright-red bug, Lygidea mendax Reut. The eggs of both are deposited in the bark of the smaller branches during the summer and remain unhatched till the following spring. The eggs of the former hatch soon after the leaves of the fruit buds start and those of the latter about a week later. Consequently it makes a difference which species is abundant in the orchard and observations show that apparently one species may be numerous and then the other. This has resulted in much confusion among fruit growers and more or less unsatisfactory control.

These insects are becoming increasingly abundant in many orchards in widely separated parts of the State and in not a few instances have proved very injurious, occasionally destroying one-fourth of the fruit.

Reports received during the past season indicate either a general prevalence, a local abundance or in a few instances somewhat general injury in the following counties: Allegany, Broome, Columbia, Dutchess,* Monroe, Niagara, Ontario,* Orange,* Orleans,* Rockland, Schuyler, Seneca, Steuben,* St Lawrence, Ulster,* Wayne,* Wyoming and Yates,* the injury appearing to be particularly evident in those distinguished by a star.

The earliest evidence of injury to the small apple is a slight exudation accompanied by a local discoloration and hardening. The young fruit is frequently pierced to the core and as growth continues depressions with pithy centers extending deep into the tissue may be noted. There is usually a marked irregularity in the shape of the apple and many of those most seriously affected are dwarfed and drop about midsummer. The earlier signs of infestation are of considerable importance and are indicated by an indistinct reddish brown spotting of the more tender opening or recently unfolded leaves. This discoloration has been compared to the appearance presented after a light dusting with red pepper. It is usually easy to find the small bugs, only one-twenty-fifth of an inch or so in length at this time, near the leaves showing the first signs of attack. As the injured foliage ages the discoloration becomes somewhat darker and after a time the central portion of the more seriously affected tissues may die and drop, leaving an irregular series of reddish brown margined holes in the somewhat crumpled curled leaves, a very characteristic sign of earlier injury.

It is possible by careful examination to detect the presence of these pests before the fruit has been materially damaged and early and thorough spraying with a tobacco soap preparation is the best remedial treatment. If a general and moderate infestation is suspected, it may be sufficient to delay treatment until applying the calyx or codling moth spray and add thereto a tobacco extract (40 per cent nicotine) at the rate of three-quarters of a pint to 100 gallons of spray. Should there be a severe infestation, particularly of the earlier hatching red bug, this will hardly provide adequate protection and it may even pay to give a special treatment just as the blossoms are breaking, using simply a nicotine soap preparation. The delayed dormant spray with nicotine added if held sufficiently late, that is, until the pink of the blossom shows, may make it possible to avoid an extra application, provided conditions permit a treatment of the affected trees within the very limited time when the blossoms are in this condition.

SMALL FRUIT INSECTS

Raspberry Byturus (Byturus unicolor Say). The moderately small, yellowish brown beetles appear in raspberry patches early in the season, feeding upon the unfolding leaves or unopened buds and frequently cutting a circular hole into the latter. The pests display a marked fondness for the tender leaves, feeding between the veins and producing a series of irregular, somewhat linear, skeletonized areas sometimes extending through to the under surface of the leaf. This pest was reported in early June as prevalent in Marlboro township and caused considerable damage to the flower buds, it being estimated that one-third of the buds were destroyed in some berry patches. Usually the damage is nearly over before the presence of the insect is realized.

The most satisfactory method of controlling this species is by early and heavy applications of arsenate of lead, using 8 pounds of paste to 100 gallons of water and spraying before the beetles have inflicted any material injury. In case there is an unusually severe outbreak this spraying may be supplemented with kerosene emulsion, 15 per cent kerosene or the standard formula used at the rate of 1 gallon to 3½ gallons of water, a strength recommended by entomologists of the Ohio Agricultural Experiment Station. It is quite possible that a tobacco extract, nicotine sulphate, 40 per cent nicotine, used at the rate of three-fourths of a pint to 100 gallons of water to which is added 6 to 8 pounds of any cheap soap, would be equally effective in destroying the beetles and less likely to harm the foliage.

There have been some unfortunate results following the use of an arsenate of lead and sulphur mixture upon raspberry foliage. The difficulty may have been due to the character of the preparation and, lacking more definite information, we would simply suggest caution in the employment of any such material upon berry bushes.

GRASS AND GRAIN PESTS

June beetles and white grubs (Phyllophaga fusca Frohl· and others). These insects are more or less common every season though during the last decade, at least, there has been a marked abundance of the beetles at rather well-defined triennial periods followed the next season by injury, sometimes serious, in grasslands adjacent to woodlands or near a number of trees. The reason for this is due to the fact that the parent beetles feed upon the foliage of a variety of trees at night, displaying a marked preference for oak, birch, elm and, under certain conditions, maple, and during the daytime shelter in nearby grass. The eggs are laid in these latter localities among the roots of the grass. The young grubs hatch in a few weeks and feed for a time that season, and the following year are very destructive because it is then that most of the growth occurs and consequently there is more feeding. The abundance of the pests can be approximated by the amount of feeding upon trees; attention was called to this last spring in an effort to interest farmers in judging the probabilities for another season. The grubs are so small at the end of the first summer or in the following spring, being about one-fourth of an inch in length, that they can be easily overlooked unless a special search is made. They have the general characteristics of the larger ones and are therefore easily recognized, and it is possible by careful examination to determine whether there are any numbers in sod land. The probabilities favor severe injury by white grubs to susceptible crops, such as potatoes and corn planted on recently turned sod in the vicinity of trees which were defoliated last year. Farmers are advised to look into this matter carefully and if it is necessary to plant such crops upon sod land, to make careful examination so as to be certain that small white grubs are not sufficiently numerous as practically to prevent the securing of a crop. It would be safer in sections where June beetles were numerous to avoid this risk even if it meant changing the rotation.

The following is a brief summary of June beetle conditions throughout the State:

Albany county. June beetles were very abundant in and about Albany, were reported as numerous at Ravena and evidences of their work were very apparent along the West Shore tracks from Wemple south to Ravena. They were so abundant at Feura Bush as to cut off practically all the prunes in a small orchard.

Allegany county. The insects were reported abundant by Mr D. P. Crandall of the Belfast High School.

Broome county. June beetles were reported numerous in the vicinity of Binghamton.

Chautauqua county. The insects were present here and there in numbers, some farmers stating that the beetles were more abundant than ever before. There was some damage to trees, especially elms.

Columbia county. June beetles were generally somewhat numerous in both the northern and southern portions of the county, feeding being very apparent here and there.

Chenango county. The insects were very numerous about Norwich and the defoliation was estimated as ranging from 25 to 30 per cent.

Delaware county. June beetles were abundant in some sections and reported by one person as very numerous in all parts of the county.

Dutchess county. The insects were very numerous at Red Hook though they did not appear to be generally distributed and serious in the county.

Fulton county. June beetles were present in about the usual numbers.

Genesee county. The insects were mostly abundant and probably more numerous than during the preceding two seasons.

Greene county. June beetles were very plentiful near Athens, though reports would indicate no unusual numbers.

Lewis county. The pests were about as numerous as three years ago over nearly the entire county, elms, basswood and birch being badly injured, maple slightly so.

Livingston county. Slight injury to elms was reported, though there was no marked abundance of the beetles.

Oneida county. The insects were reported from several localities, though presumably not excessively numerous.

Ontario county. Practically the same conditions appear to have obtained as in Oneida county.

Orange county. The beetles were reported numerous the middle of June.

Orleans county. The insects were abundant or common though not excessively so.

Oswego county. A comparatively slight infestation was reported.

Rensselaer county. Partial defoliation of elms, certain oaks and white birch was rather generally evident in southern Rensselaer county, this being especially marked along the Albany Southern and Boston and Albany railroads. The damage was mostly on trees adjacent to grasslands. In some instances oaks, hickories and ash standing in or near grasslands were almost completely stripped. There was less damage along the river and also on the eastern border of the county.

Rockland county. June beetles were variously reported as few to abundant.

Saratoga county. No unusual numbers were observed.

Schuyler county. June beetles were fairly abundant though not excessively numerous.

Seneca county. The pests were reported as extremely abundant over a period of several weeks.

Steuben county. June beetles were reported abundant, a condition probably true of most of the county.

Suffolk county. There was serious injury to birch, maple and elm in Suffolk county localities, though oak, mulberry, hickory, locust and plum were only slightly damaged. June beetles were variously reported as being somewhat numerous or extremely abundant.

Ulster county. The insects were very abundant for approximately 2 miles on either side of the mountains, due in all probability to there being so much waste grassland and forest areas. Oaks, elms and birches were considerably eaten on the lower mountain areas, while chestnut, basswood, pines and spruces were but slightly damaged.

Wayne county. The insects appear to have been moderately numerous and no serious injury to trees was noted.

Yates county. June beetles were plentiful or abundant, though no particular area was seriously affected.

Corn billbug (Sphenophorus sp.). A package of timothy corms infested with grubs tentatively referred to this genus was received under date of August 10th from F. H. Lacy, Dutchess county agricultural agent, accompanied by a statement that presumably at least 10 per cent of one field was thus affected.

The larvae are thick bodied, oval, footless grubs with hard, brown or blackish heads, the first segment behind the head being leathery, smooth and slightly tinged with brown. They occur most frequently in the corms of timothy and in the thick root growths of common reeds, club rushes, coarse sedges and swamp grasses found in wet situations. These grubs occasionally cause serious injury to timothy meadows, and corn planted on recently broken land may be infested by these pests, insects which are much better known in the southern and central states. Damage of this character is rarely reported in New York State, presumably because conditions are unfavorable for the breeding of these insects.

Recently broken land should not be planted to crops liable to injury, and this is particularly important in sections where there has been more or less damage. Plowing in early fall has also been found of some service and it is possible that considerable benefit might accrue from burning over swamp and grasslands infested or presumably infested with these pests.

Wheat midge (Thecodiplosis mosellana Gehin). The work of this insect has been known for years, and about the middle of the last century it was one of the very destructive wheat pests. Conditions appear to have changed greatly since then and comparatively little damage has been recorded, though the familiar yellowish maggots have been repeatedly observed in the heads of wheat. Despite the fact that this is a well-distributed and relatively common insect, it has not been possible as yet to rear such a series of the midges as to establish beyond question the identity of the one or more species responsible for the damage.

The work of this insect was first noticed the past season in heading rye. It was found to be generally present and in a few fields it undoubtedly caused considerable damage by blasting an appreciable percentage of the kernels. Later it appeared upon ripening wheat in the western part of the State and the loss in southern Niagara and northern Erie counties was estimated at 20 per cent in shrunken wheat. The actual damage in other wheat-growing counties appears to have been considerably less, that in Orleans being placed at 3 to 5 per cent. It is very difficult to get at the exact figures, since, unless the insect is so numerous as practically to destroy the grain in the heads, it appears probable that the strength of the plant which ordinarily would be divided between a number of kernels would, on the early destruction of some, be thrown into the remainder, which appears to be the explanation of fairly good crops on fields showing a rather general and moderately severe infestation.

There is no practical method known of controlling this pest. The injury the past season was due largely, if not entirely, to unusual climatic conditions at the time the grain was heading and the probabilities of similar damage another season are very remote. It is well known that the related Hessian fly, for example, develops readily in soft growing grain and under such conditions may be very injurious, whereas if the stem is moderately hard, the maggots fail to develop. The controlling factors in case of the wheat midge appear to be nearly the same and whenever conditions favor a rapid development and maturity, especially the latter, of the heading grain, there is comparatively little to fear from the wheat midge.

Grass webworm (Crambus luteolellus Clem.). It was apparently this species which caused considerable damage to corn in the town of Cambridge, Washington county, the past season and was also reported as somewhat injurious in Oneida county. The grass webworms are relatively common insects if one may judge from the abundance of the moths, yellowish, yellowish brown, sometimes slate color, about one-half of an inch long and with a wing spread of an inch or less. These close wings, as they are known, are easily recognized in the field by the short flight and especially the characteristic resting attitude, lengthwise of the supporting stalk and with the wings rather closely wrapped about the body. The eggs are dropped indiscriminately on grassland. Recently turned sod is likely to be moderately infested with partly grown hungry caterpillars which usually shelter in a webby retreat near the surface and generally close to the base of affected corn or other plants upon which the insects feed. Remedial treatment is out of the question and injury is best avoided by not planting corn on recently turned sod in sections where these pests are likely to be troublesome.

Grasshoppers (Melanoplus atlanis Riley and others). These familiar pests were exceedingly abundant and destructive in the foothills of the Adirondacks in 1914, and less so in 1915. On account of these ravages they have been watched rather closely, especially during the past season, because of the importance of anticipating and preventing serious injury. The unusually heavy and continued rains during the spring and early summer were unfavorable to the development of young grasshoppers and greatly promoted the growth of vegetation, both being not unimportant factors in reducing insect injury, especially if the latter be judged from casual indications.

The cool weather delayed the appearance of the young insects and it was not till the latter part of June that reports were received of their being locally abundant, especially in the vicinity of Saratoga Springs. An examination at that time revealed a few limited areas where there was a moderate to somewhat heavy infestation, though in most instances there were not enough insects to threaten the crop seriously. Similar conditions were found to obtain on certain sandy areas in the town of Easton, Washington county, though the infestation was decidedly less than that observed in Saratoga county. A sandy area in the town of Schuylerville, directly west of Haystack station, was somewhat generally infested in early July, many of the insects probably drifting in from near-by semiwild, grassy areas. There were a few spots, evidently hatching grounds, on this latter where the insects had evidently been very abundant a little earlier. They were also numerous along a sandy lane.

It is quite possible to overestimate the numbers of these pests, particularly where leaf hoppers are numerous, and this is just what occurred in certain fairly well-grassed pastures in the last-named area. It was easy to recognize a few of the small hoppers and then assume that all the jumping insects were these pests, whereas a considerable proportion were comparatively harmless leaf hoppers. It should be remembered that serious infestations of young grasshoppers are invariably accompanied by a partial ragging of clover or other acceptable food, and where this does not occur insects are not abundant or else are likely to be something else than grasshoppers.

Later in the summer half-grown to nearly adult grasshoppers were to be seen here and there in considerable numbers and in early September there were reports of the insects ruining cabbage and cleaning up grass fields in portions of the towns of Galway, Charlton, Ballston and Northumberland. There was also serious injury to some two thousand young pear and apple trees on the place of ex-Congressman Peter Ten Eyck near Meadowdale, approximately three-fourths of the trees being defoliated. Young trees in other sections were also injured in a similar manner.

The above indicates the desirability of watching developments throughout the season. An unusual abundance of grasshoppers near valued crops or trees should be destroyed by the early use of the poisoned bait. It is our opinion that this material can be used much more generally than it has been, especially along roadsides and on minor areas where the insects are comparatively thick. The total damage by these general feeders is much larger than most people realize, while in many cases remedial measures are comparatively inexpensive.

Grass mite (Pediculopsis graminum Reut.). Stems of timothy with prematurely whitened heads were received under date of July 16, 1917, from G. P. McRostie, Kingston, accompanied by the statement that the meadow from which the sample was taken had approximately 50 per cent of the stems thus affected. There was a shriveled portion at the base of the leaf characteristic of the work of the mite, though none of the pests were to be found in the material submitted for examination. A Cecidomyid larva was found under the leaf sheath of one specimen. It was impossible to rear the insect and it may have been an accidental occurrence, though the probabilities are that it was predaceous and possibly referable to the genus Aphidoletes.

The same type of injury was rather common in several fields on the state road from Malden Bridge to Chatham and also in the town of Ghent. The injury easily amounted to 25 per cent and in limited areas might well run to 50 per cent of the heads. This pest was also troublesome in Dutchess county.

This grass mite appears to be widely distributed in the United States, since it has been reported from Nebraska, in widely separated sections of Illinois, and is stated by Hodgkiss to be a rather common species upon several grasses in New York State. It is also recorded as injuring carnation buds. A fungus, Sporotrichum poae Peck, is frequently associated with the work of this mite in both grass and carnations and it may be that the fungus is the more important enemy of the plants, though it appears to depend for its establishment largely upon the activity of the mite. Moderately early cutting of grass would very probably assist in checking the development of this mite and the associated fungus.

GARDEN INSECTS

Rose beetle or rose chafer (Macrodactylus subspinosus Fabr.). This insect is preeminently an inhabitant of sandy and grassy areas and almost invariably outbreaks occur in the immediate vicinity of such surroundings. The grubs live on roots of grasses growing in sandy soil and the swarms of beetles simply feed upon the nearest attractive vegetation, most frequently grape vines and apple trees, beans, corn and other crops. There have been more complaints of this insect than ever before, stimulated, in part, probably, through the intensive campaign to secure a maximum production. Most of the damage, as might be expected, occurred in regions where there are considerable sandy areas, notably Essex, Fulton, Suffolk, Warren and Washington counties.

The elimination of wild grassy areas in sandy sections is a most effective though unfortunately not often a practical preventive measure. The appearance of swarms of beetles on young plants, such as corn or beans, can hardly be otherwise than disastrous, owing to the fact that it is impossible to kill the pests with poison before they have destroyed most of the vegetation, and under field conditions resort to hand picking or similar measures is impractical. It has been shown that heavy applications of arsenate of lead, 5 to 10 pounds to 50 gallons of water, especially if glucose or some cheap sweetening is added, is of considerable value not only in destroying the beetles but in protecting the plants from attack. This can hardly be advised, however, for field crops, though it may be recommended for vineyards and the more valuable apple trees. Ornamentals etc., frequently can be protected at very slight expense by the use of ordinary mosquito netting.

Black vine weevil (Otiorhynchus sulcatus Fabr.). Grubs of this weevil were received in December from L. F. Strickland, agent of the State Department of Agriculture, accompanied by the statement that they had seriously injured primroses and cyclamens in a large greenhouse belonging to Fred G. Lewis of

Lockport. Since it requires two years to grow these plants and as the injury does not show until those blossoming wilt in the sun, there may be serious damage before the grower suspects the presence of an insect pest. There are a number of records of this weevil injuring these plants, and also gloxinias, geraniums and other greenhouse plants.

The beetles have been recorded as feeding on ferns by Johannsen and as eating the leaves of palms, lemon trees, Tradescantia and Dracaena[1] by Britton. The grub is also known as a crown borer of strawberry, it working in this plant in much the same way as several other borers. Mr Lewis states that in his experience the pest confines itself to plants having a crown, such as gloxinias, tuberous begonias and cyclamen. In Tasmania it is counted as one of the worst strawberry pests. There is also a record of injury to Taxus and rhododendron plants in Europe as well as various garden vegetables, and Doctor Britton[2] records injury to both Taxus and Retinospora in Connecticut, a number of valuable plants being killed.

The parent beetle or weevil is nearly one-half of an inch in length, moderately stout, dark brown or black and marked with scattering spots of light brown, these usually extending all over the beetle, including the head, antennae and legs.

The diversified food habits of this insect and the probability that under greenhouse conditions breeding may be more or less continuous, make it difficult to suggest satisfactory preventive or control measures for this root or crown pest. It is desirable in the case of greenhouses to exercise every reasonable precaution to prevent the introduction of plants infested by this insect. We would suggest in the case of cyclamens and primroses examining some of the plants, especially the less thrifty ones, in October or November or at least a month before blooming and in case grubs were found in the crowns or working on the roots, experimenting with a creosote solution, starting with an ounce or two to a gallon of water and increasing the amount if there is no injury to the plants. Carbon bisulphide has been used but apparently is of little value. There is a possibility that several sprayings or waterings with a tobacco soap preparation at the usual strength for plant lice at approximately two-week intervals in late October or November would have considerable preventive and possibly remedial value. Enough of the tobacco preparation should be used to saturate the upper layers of the soil.

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[1] 1909 Conn. Agri. Exp. Sta. 8th Rep't of State Ent., p. 846.

[2] 1914 Conn. Agri. Exp. Sta. 13th Rep't, p. 230.

The wingless beetles feed, as indicated above, on a variety of plants. Owing to the fact that they must crawl from one to another before depositing eggs which develop into destructive grubs, it should be comparatively easy to prevent injury to annual potted plants by making it impossible for crawling insects to get from infested permanent plants to the others. Bands of tree tanglefoot have proved most effective barriers against various crawling insects and it should not be difficult to protect individual beds or series of beds with this material. The probabilities are, in some greenhouses at least, that the pests make their way from some of the more permanent plants which show comparatively little injury to the smaller potted ones. Consequently if the latter can be so placed on isolated benches or in separate ranges that crawling insects can not make their way to them, the difficulty may be solved in large measure.

Seed corn maggot (Pegomyia fusciceps Zett.). The work of the seed corn maggot in bean fields began to be apparent the last of June and continued well into July. The small, whitish maggots about one-fourth of an inch long when full grown were associated with general and serious injury to beans, producing " bald heads " and eating long channels (plate 3) in the stems. The tendency of the grower was to blame the insects for all this damage, though subsequent investigations have satisfied us that in large measure the difficulty was due to abnormal weather conditions and a system of planting not adapted to an excessively wet soil, thus producing an environment favorable for the development of this insect. An examination of a number of fields in different parts of the State clearly demonstrated that the mischief was restricted very largely, if not entirely, either to excessively wet land or to fields where planting was too deep for the amount of moisture in the soil. In other words, if there had been more shallow planting or a less saturated soil, there would have been comparatively little trouble from this insect.

The following figures give some idea of the situation. The loss on seed alone in one 9 acre field in Genesee county amounted to $70, while from 50 to 75 per cent of the stand on 16 acres was destroyed. One Monroe county grower lost $300 on seed alone. The damage for Erie county was placed at 40 per cent and it was estimated that one-fourth of $96,000 worth of seed was destroyed in Orleans county. The work of this insect was reported from eighteen counties of the State, not a few classing the pest as serious or even severe.

This insect is closely related to the much better known onion maggot and cabbage maggot, two species which have unenviable reputations in economic literature, owing to the losses they cause. The flies of all three species are dull colored, about one-fifth of an inch long and appear much like a small housefly. The parent of the seed corn maggot is doubtless more generally present than has hitherto been supposed. It is probable that it breeds readily in decaying vegetable matter and that the reason the beans were damaged so seriously was due in large measure to the inability of the plants to outgrow attacks by the young maggots which began work on the sprouting beans and would have been practically harmless under normal conditions. The most obvious preventive measures are to put beans and other crops, such as corn, likely to be injured by this insect upon moderately well-drained land and in wetter seasons, at least, to avoid deep planting, since it is very desirable when such conditions obtain for the plants to make a quick start and grow rapidly. Field conditions prevent the employment of any repellents, such as carbolic acid emulsion or sand and kerosene, though these may be useful in small gardens.

Juniper plant bug (Chlorochroa uhleri Stal.). This is a large olive green stink bug easily recognized by the marginal pinkish markings. It has been recorded earlier (New York State Museum Bulletin 180, pages 70–71) as injuring sunflower seeds, green corn, peas while still in the pod, tomatoes, currants and blackberries.

The insect was moderately abundant in early July in a rye field at Schodack, the bugs almost invariably being upon the nearly fully developed heads and apparently feeding. Practically the same conditions were observed except that the related and frequently associated Euschistus variolarius Pal. Beauv. was the more numerous in a rye field one half of a mile west of Haystack station and a little south of Schuylerville. Messrs C. L. Carden and J. A. Holmes both stated that these bugs were sometimes very abundant in rye fields. This would seem to indicate that these large Pentatomids commonly feed upon several grains and in some instances may cause an appreciable amount of damage, though serious injury is probably very unusual.

Japanese mealy bug (Pseudococcus comstocki Kuw.). This insect was exceedingly abundant on Osage orange in New York City last October, as indicated by specimens received from

Mr J. James de Vyver. Through the kindness of Dr L. O. Howard, chief of the United States bureau of entomology, Mr Harold Morrison determined the mealy bug, after comparison with specimens which in turn had been compared by Mr Ferris with cotypes of Pseudococcus comstocki Kuwana in the entomological collection of Stanford University, and as a result he feels fairly safe in the above identification. Mr Morrison adds that there are at present in the collection upon a number of hosts and previously unnamed, specimens of this mealy bug from various points between Washington and New York City. It is reported from Japan on both mulberry trees and maples. The approximate date of its introduction is not known.

The material received from Mr de Vyver indicated an extreme abundance, since both photographs and specimens showed masses of the insects in the forks of the limbs, one mass being several inches long and composed of white, indistinct, waxy fibers and debris. This indicates great prolificacy under American conditions and as it lives upon a variety of food plants, we may find in this recent introduction another serious insect pest. It is probable that control measures recommended for the common mealy bugs of the greenhouse would be equally successful in checking this species.

European earwig (Forficula auricularia Linn.). This well-known European insect has become established in numbers at East Aurora, N. Y., according to a report, accompanied by numerous specimens, received the latter part of August from Miss Hattie C. Wallenwein. The earwigs appear to be abundant and to have established themselves over a considerable area. This insect was first noted in America at Newport, R. I., in 1911 and is said to occur there now in vast numbers.

The earwig is a rich reddish brown, apparently wingless insect about three-fourths of an inch long and most easily recognized by the conspicuous curved forceps of the male. The adults feed almost entirely on the petals and stamens of flowers, although many other kinds of food, such as clover, grass, terminal buds of chrysanthemums and other fall flowers, are eaten. They congregate in large numbers in crevices or behind vines near a good food supply and are very annoying on account of their invading porches, establishing themselves under cushions and even entering houses, to the terror of the occupants. They are harmless though not agreeable.

Experiments conducted by Mr D. W. Jones of the United States bureau of entomology show that a poisoned bread bait (consisting of

16 pounds of finely broken stale white bread, 1 pound of Paris green and enough water to make a mixture which will run through the fingers) spread broadcast over lawns and gardens between May 15th and June 15th is a very effective control measure. There should be two or three such treatments at intervals of three or four nights. He also suggests that plants which show signs of having been eaten should be sprayed at this time with arsenate of lead, using 6 pounds to 50 gallons of water, and taking care to cover the young leaves.

After July 1st, if the insects are still abundant, the author advises spraying at night with a contact insecticide, such as the tobacco soap preparation, repeated every three nights until the numbers are reduced and applied in sufficient quantities to wet the insects thoroughly. This should be supplemented by similar applications in the daytime to cracks and crevices where the insects are found in concealment. The pests can be trapped in flowerpots containing excelsior and inverted over 9 inch stakes set in the ground close to plants and vines where the insects are most numerous. They should be put every 10 or 12 feet along the borders or near vines. The earwigs can be destroyed by shaking the excelsior over a pail containing kerosene and water. A more detailed account of this insect is found in Bulletin 566 of the United States Department of Agriculture.

European springtail (Isotoma minuta Tullb.). Numerous samples, a tablespoonful or thereabouts, of these minute springtails were received under date of June 7th from Mr McPhillips of Red Hook, accompanied by the statement that they were discovered on the ground and plants in and about a hotbed. The species was kindly determined through the courtesy of Prof. J. W. Folsom of the University of Illinois, who informs us that it is a well-known European species recorded from Norway, Sweden, Finland, Russia, Scotland, Germany, Italy and Siberia and not previously reported from this country, though he has received specimens from Pennsylvania, Illinois, Kansas and Canada.

These little wingless insects are a dull bluish gray, about one-twenty-fifth of an inch long and sometimes occur in exceedingly large numbers. They live mostly upon decaying organic matter or such valueless plants as lichens, and only occasionally are members of this group injurious to plants. They can be easily destroyed in hotbeds or on restricted areas by the liberal use of hot water, a solution of hellebore, pyrethrum or tobacco extract, such, for example, as nicotine sulphate (40 per cent nicotine) used at the rate of three-fourths of a pint to 100 gallons of water, to which are added 6 to 8 pounds of any cheap soap to increase its spreading properties. Ordinarily remedial measures are unnecessary.

GALL INSECTS

White oak club gall (Andricus clavula O. S.). Specimens of this gall were received February 14, 1917 from the Munson-Whitaker Company of New York, accompanied by the statement that something had been causing one or two trees to die yearly.

An examination of material revealed an interesting condition in that galls were very rarely found on wood more than three years old, indicating that infested branches are likely to break off or that the infestation was of limited extent. In addition, a number of enlarged buds were found infested by maggots, possibly the alternate generation of this species. From 90 to 95 per cent of the twigs or branches in the series of samples about 2 feet long either bore galls or had one or more of the terminal buds infested by maggots. The following is a summary of the condition of a few of the branches.

Branch 1 bore four old and three last year galls and eight infested buds. Branch 2 had six old and six last year galls and five infested buds. Branch 3 had six last year galls and one infested bud. Branch 4 had three old and six last year galls and six infested buds. Branch 5 had one old and five last year galls and five infested buds.

It is difficult to give a percentage estimate of the number of buds infested, though in most instances the few branches not bearing galls were very likely to show infested buds. This weakening of the circulation due to the development of the galls and the interference with the growth of the tree as a result of the blasting of the buds has very probably reacted upon the vigor of the infested trees and may have been an important factor in reducing their vitality. The conditions suggest that further investigation is desirable in order to determine more accurately the effect these insects may have upon the host.

Ribbed bud gall (Andricus gemmarius Ashm.). The galls of this insect are occasionally so numerous as to attract hosts of honey-gathering insects, such as bees and flies, due to the abundant sweetish secretion exuded during early summer. Specimens of these galls were received under date of June 10th from Mrs William G. Drake, Newton, N. J., accompanied by the statement that attention was at first drawn to the infestation by the humming or the " roaring " of the numerous insects in the tree and an examination showed a very large proportion of the twigs to be badly affected. The extent of the infestation is indicated in figure 9, a drawing made from one of the samples. Mr A. D. Tilton of the entomology department, Massachusetts Agricultural College, submitted an oak twig showing a very serious infestation and stated that the insect had killed the tree.

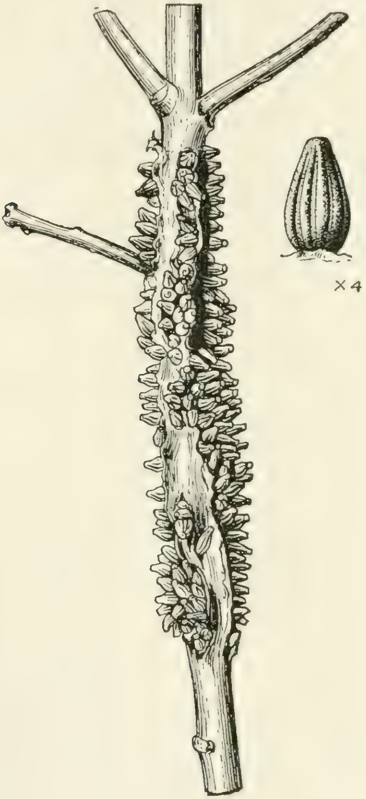

Fig. 9 Ribbed bud gall, Andricus gemmarius Ashm. Badly infested twig and one gall enlarged. (Original)

The deformations following attack by this insect are so large and irregular, practically girdling the twigs in many cases, that they probably seriously interrupt the flow of the sap and weaken the portion of the limbs beyond the point of injury to such an extent that in a few years they are likely to break off. The developing galls are upon two-year old wood, that is, that which grew the second season preceding. The individual galls in June are about three-sixteenths of an inch long with a diameter of one-sixteenth of an inch, plainly ribbed, greenish and moderately soft. At this time considerable sweetish fluid must be excreted, since badly infested trees are very attractive to insects, both bees and flies being present.

If the oak club gall and the knotty oak gall are injurious to trees, it is very probable that this species is detrimental, especially when abundant and the infestation is allowed to continue for a series of years. It is very probable that the damage could be minimized to a considerable extent by judicious pruning and burning of the infested twigs in early summer prior to the galls maturing and dropping from the twigs.

Linden bark gall (Agromyza tiliae Coud.). Twigs of American linden infested with this insect were received April 21, 1917, from Dr Hermann von Schrenk, St Louis, Mo., accompanied by the statement that the gall fly was abundant and seriously injurious to lindens at Kirkwood. Badly infested twigs, he stated, break off after a time, evidently because the circulation of the sap is seriously disturbed. The puparia occur in early spring in cells under a comparatively thin layer of bark, a portion of which is somewhat dried and with a distinctly lower vitality than normal bark. These conditions suggest applications of a miscible oil, since there is a chance that the cells will be penetrated and a considerable number of the insects destroyed. Unfortunately conditions prevented testing this method the past season.

PUBLICATIONS OF THE ENTOMOLOGIST

The following is a list of the principal publications of the Entomologist during the year 1917. The titles,[1] time of publication and a summary of the contents of each are given. Volume and page numbers are separated by a colon.

New Western Gall Midges. New York Entomological Society Journal, 1916, 24:175-96

The genus Onodiplosis is erected and the following new species described: O. sarcobati, Hormomyia caudata, Asphondylia chrysothamni, A. adenostoma, Asteromyia gutierreziae, Lasioptera echinochloa, L. inustorum, Rhopalomyia enceliae, R. salviae, R. ampullaria, R. grindeliae, R. utahensis, R. chrysothamni, R. glutinosa, R. erigerontis, R. ericameriae, Phytophaga wellsi, P. timberlakei, Diarthronomyia artemisiae, D. occidentalis, D. floccosa, and Monardia foliata. The previously unknown female of Asteromyia grindeliae is also described and a table given for the separation of the species of Diarthonomyia.

New North American Gall Midges. Entomological News, 1916, 17:412-17

The following new species are characterized: Asynapta marilandica, Dasyneura lupini, Asphondylia shepherdiae and Retinodiplosis taxodii.

Bleeding Trees. Tree Talk, 1916, 4:42

Description of injuries by Mycetobia divergens Walk. and a discussion of control measures.

Efficiency of Spraying. Entomologist [London], 1916, 49:254-55

General statements respecting the efficiency of arsenical applications in New York and New England.

New Indian Gall Midges. Canadian Entomologist, 1916, 48:400-6

The following new species and genera are described: Colpodia fletcheri, Harpomyia n. g., type H. indica, Indodiplosis n. g., type I. mangiferae and Streptodiplosis n. g., type S. indica n. sp.

Injurious Insects. New York Farmer, January 18, 1917, p. 6

A brief discussion of the actual preventive or repressive value of good crops for insect outbreaks with special reference to grasshopper ravages.

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[1] Titles are given as published. In some instances articles appearing in a number of papers have been given different titles by the various editors.

Common Shade Trees and Their Principal Insect Enemies. Conservation Commission [State of New York], Bulletin 7, 1917, p. 16–17

Tabulation showing relative immunity from insect attack of the more important shade trees.

New Indian Gall Midges. Entomological News, 1917, 28: 73–76

The following new species are described: Lasioptera fluitans, Pseudhormomyia fluvialis and P. cornea.

Insect Enemies of Small Fruits. Poughkeepsie Eagle-News, February 23, 1917, p. 8

Tabulation of small fruit insect injuries with brief discussions of some of those affecting strawberries and grapes.

A Pest to Horticulture. Catskill Recorder, March 16, 1917, p. 6; New York Farmer, March 22, 1917, p. 3

A brief warning notice advocating the use of a thick lime sulphur wash just before the buds crack or begin to open for control of pear thrips.

Report of the Committee on Entomology. New York State Fruit Growers' Association, 16th Meeting, 1917, p. 23–29

Contains a brief note on Cicada by Messrs Hadley and Matheson, a summary of methods of controlling plant lice by Professor Parrott and an account of work by the Entomologist upon the codling moth, red bugs, apple maggot and mentions the new peach borer, Laspeyresia molesta Busck.

Insect Enemies of Small Fruits. New York State Fruit Growers' Association. 16th Meeting, 1917, p. 245–52

A brief summary of the injuries and methods of controlling the principal insect enemies of strawberries, blackberries and raspberries, currants and gooseberries and the grape.

Codling Moth Control. Catskill Recorder, May 11, 1917; Rochester Union & Advertiser, May 9; Poughkeepsie Eagle-News, May 10

Summary statement of results obtained from spraying, with formula for preparing arsenate of lime for use in place of arsenate of lead.

Garden Pests. New York State Food Supply Commission, Preparedness Circular, May 8, 1917. Catskill Recorder, June 15

Brief, practical directions for the control of many of the more common insect pests.

Distribution of Gall Midges. National Academy of Sciences, Proceedings, 1917, 3: 349–54

A tabulation of the known distribution of the genera with a discussion of the agencies influencing dissemination.

Two New Sawflies. Canadian Entomologist, 1917, 49: 191–92

Pleuroneura borealis and Acantholyda ferruginea from the Adirondacks are described as new.

Little Known Midge Galls of Certain Composites. Ottawa Naturalist, 1917, 31:13–14

A tabulation of the galls on various species of Artemisia with observations on galls of associated plants.

Elm Pests Abundant. Tree Talk, 1917, 4:107

Brief warning notice in relation to the elm case bearer, Coleophora limosipennella Dup., advocating early spraying with a poison.

Mosquitoes at Yaphank. New York Tribune, August 1, 1917

A general consideration of the local situation in relation to its broader applications. The adoption of comprehensive measures for insect control in temporary camps or industrial settlements is urged and the desirability of an entomologist being attached to every large camp or hospital center reaffirmed.

Chinch Bug. Grasses and Leguminous Crops in New York State. N. Y. Department of Agriculture, Bulletin 87, 1916 [1917], p. 2852

Brief discussion of control measures with especial reference to grasses and sorghum.

Household and Camp Insects. New York State Museum, Bulletin 194, 1917, p. 1–84, 41 figs. [Issued October 1, 1917]

A revised and extended edition of Museum Bulletin 136, Control of Flies and Other Household Insects.

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Indian Gall Midges. Entomological News, 1917, 28:369–72

Both sexes of Hormomyia ischaemi Kieff. are described for the first time and a new species, Dyodiplosis andropogonis characterized. The former was reared from Ischaemum pilosum and the latter from Andropogon annulatus.

ADDITIONS TO COLLECTIONS, OCTOBER 16, 1916–OCTOBER 15, 1917

The following is a list of the more important additions to the collections:

DONATION

Hymenoptera

Caliroa cerasi Linn., cherry and pear slug, larvae and work on pear, July 29, Theodore Bayer, Averill Park

Diprion abbotii Leach, Abbot's pine sawfly, larvae on pine, August 24, B. H. Paul, Hemlock lake. Same, September 13, Dr Albert Vander Veer, Camp Alkmaar, Big Moose

Diprion lecontei Fitch, Leconte's sawfly, adult on spruce, July 23, C. H. Zimmer, Westbury

Trichiosoma tibialis Steph., hawthorn sawfly, cocoons on white birch seedlings, February 16, Orleans. Through State Department of Agriculture

Tremex columba Linn., pigeon tremex, larva on maple tree, September 24, B. H. Terwilliger, Ellenville

Andricus clavula O. S., white oak club gall on white oak, February 14, Mr Mager, New York City. Through Munson-Whitaker Company. Same, gall on black oak, February 19, A. D. Tilton, Medford, Mass.

Andricus lana Fitch, galls on oak, October 3, Chester I. Warren, Troy

Rhodites radicum O. S., rose root gall, December 5, J. J. Levison, New York City

Bremus (Bombus) impatiens Harr., adult, May 21, Roy Latham, Orient

Prospaltella perniciosi Tower, on San José scale infested peach, September 28, J. A. Thomson, Rochester

Megastigmus aculeatus Swed., adults and infested seeds of Rosa multiflora, June 5, Harry B. Weiss, New Brunswick, N. J.

Apis unicolor adamsoni Latr., Bombus ternarius Say, Bombus var. rufosuffusus Ckll., Xylocopa fuliginata Panz., Inzona cupira Sm., Melissodes masuca Ckll., Diadasia australis Ckll., Augochlora seminigra Ckll., Halictus pilosus Sm., H. pectorialoides Ckll., H. blackburni Ckll., H. armaticeps Cress., H. gulosus Ckll., H. synthyridis Ckll., H. coactus Cress., H. pruinosiformis Craw., H. jamaicae Ellis, H. ruidosensis Ckll., H. perdifficilis Ckll., Halictoides marginatus Cress. All from Prof. T. D. A. Cockerell, Boulder, Col.

Coleoptera

Brachytarsus sticticus Boh., adult on smutted wheat, August 20, F. J. Rimoldi, Albion

Dendroctonus simplex Lec., adults on larch, August 8, H. H. Stage, Crittendon

Eccoptogaster picea Swaine, adults on larch, August 9, H. H. Stage, Crittendon

Eccoptogaster rugulosus Ratz., fruit tree bark beetle, adult on plum, July 24, H. J. Tillson, Essex

Xyleborus dispar Fabr., pear blight beetle, on apple, F. L. Schmucker, Islip

Diorymellus laevimargo Champ., adult on orchids, May 28, Harry B. Weiss, Secancus, N. J.

Lixus concavus Say, rhubarb curculio, adults on rhubarb, July 5, R. Fricke, Jamestown

Phytonomus nigrirostris Fabr., adult, May 21, Roy Latham, Orient

Otiorhynchus singularis Linn., adult, May 7, Dr G. G. Atwood, from England

Otiorhynchus sulcatus Fabr., black vine weevil, grubs injuring roots of primroses and cyclamens, December 26, F. G. Lewis, Lockport. Through L. F. Strickland

Rhynchites bicolor Fabr., rose curculio, adults on rose buds, June 28, F. J. Rose, South Byron

Pomphopoea sayi Lec., Say's blister beetle, adults on clover and vetch, July 14, Henry C. Morse, Oneida. Same, adult on peach, June 25, H. V. DeMott, Canandaigua

Macrobasis unicolor Kirby, gray blister beetles, adults on potato, July 19, John C. Cottrell, Eagle Bridge. Same, adults on potatoes, July 25, Charles Cottrell, R. F. D. 2, Hoosick Falls

Coptocycla signifera Herbst., variable tortoise beetle, adult on morning glory, June 20, Endicott. Through Mrs M. W. Martin

Coptocycla bicolor Fabr., golden tortoise beetle, adult on morning glory, June 20, Endicott. Through Mrs M. W. Martin

Haltica ignita Ill., strawberry flea beetle, adult and larva on elm, August 29, H. B. Filer, Grand Island

Disonycha caroliniana Fabr., adult, May 21, Roy Latham, Orient

Galerucella luteola Müll., elm leaf beetle, adult on elm, August 12, J. A. Thomson, Rochester. Same, August 14, John Brothers, Johnstown. Through Conservation Commission. Same, larvae and pupae on elm, July 30, N. M. Bump, Binghamton

Diabrotica duodecimpunctata Oliv., southern corn root worm, adults on beans, July 10, H. G. Chapin, Watkins

Ceratoma trifurcata Forst., bean leaf beetle, adults and work on beans, July 14, Gerson Gârb, Mineola

Lema trilineata Oliv., three-lined potato beetle, adults on potato, July 5, R. Fricke, Jamestown

Eburia quadrigeminata Say, adult, September 25, Mrs Sherman Bishop, Canandaigua lake

Osmoderma eremicola Knoch., hermit flower beetle, larva, September 8, J. F. Rose, South Byron

Xyloryctes satyrus Fabr., rhinoceros beetle, adult (female) on lilac and peach, September 12, J. J. Levisòn, Sea Cliff

Macrodactylus subspinosus Fabr., rose beetle, adult injuring corn, June 30, F. A. Roper, Hudson Falls. Same, adults on rose bushes, July 5, J. H. Phillips, Essex. Same, adults injuring beans, July 10, W. J. Granger, Broadalbin

Ptinus fur Linn., white marked spider beetle, adults and larvae in paprika, September 27, Miss E. S. Blunt New Russia

Melanotus communis Gyll., larva on corn, June 13, E. B. Underhill, Poughkeepsie

Dermestes lardarius Linn., larder beetle, adult, April 20, H. G. Haynes, Delhi

Typhoea fumata Linn., adult, August 30, F. S. Barlow, Cooperstown

Saprinus rotundatus ? Kugel, adult, May 21, Roy Latham, Orient

Harmonia similis Rand., adult, May 21, Roy Latham, Orient

Adalia bipunctata Linn., lady beetles, larvae on potato vines, August 3, F. A. Roper, Hudson Falls

Chlaenius sericeus Forst., adult, May 21, Roy Latham, Orient

Diptera

Sayomyia ? trivittata Loew., phantom larva, January 27, H. D. Gehret, Mineville

Lasioptera vitis O. S., grape tomato gall, June 30, G. P. McRostie, Kingston. Same, July 6, George Grossefinger, Manorville. Same, July 11, A. A. Douglass, Suffern

Neolasioptera hibisci Felt, adult on Hibiscus, August 25, E. L. Dickerson, Nutley, N. J.

Rhabdophaga salicis Schr., European willow gall, June 23, Ambrose Smith, Perrysville, Pa. Through Prof. C. H. Hadley, Extension Entomologist, State Department of Agriculture Extension, State College, Pa.

Rhabdophaga aceris Shim., maple leaf midge, adults on maple leaves, August 7, N. B. Beers, Gloversville

Contarinia virginianiae Felt, choke cherry midge, larvae and galls on choke cherries, July 12, A. F. Burgess, Melrose Highlands, Mass.

Diarthronomyia hypogaea H. Lw., chrysanthemum midge, galls, October 24, R. M. Winslow, Victoria, B. C. Same, galls and adults, November 7, Dr Edith M. Patch, Orono, Me. Same, galls, December 21, C. H. Hadley, State College, Pa. Same, January 18, A. I. Bourne, Fitchburg, Mass., and Providence, R. I.

Schizomyia coryloides Walsh and Riley, grape filbert gall, September 10, A. E. Barnard, Williams Bay, Wis.

Monarthropalpus buxi Lab., box leaf midge, larvae and galls, April 8, J. J. Levison, Sea Cliff

Aphidoletes ? meridionalis Felt, probably reared from aphids on sea lavender, Limonium carolinianum, August 7, Henry Bird, Rye

Erosomyia mangiferae Felt, adults on mango, February 6, F. W. Urich, Port of Spain, Trinidad

Cincticornia pilulae Walsh, oak pill gall, October 3, Chester J. Warren, Troy

Retinodiplosis taxodii Felt, cypress seed midge, gall, October 19, Otto Katzenstein & Co., Atlanta, Ga. Through E. R. Sasscer, United States Bureau of Entomology

Itonididae, 648 pinned specimens, some very desirable species, were collected at Keene Valley by Mr Howard Notman and generously given to the State Museum

Tabanus lineola Fabr., lined horse fly, adult, August 27, Roy Latham, Orient

Phorbia fusciceps Zett., seed corn maggot, larvae and work on beans, June 17, F. P. Cullinan, Batavia. Same, larvae on beans, June 17, F. J. Rose, South Byron

Agromyza tiliae Coud., linden bark gall, puparia on linden, April 18, Dr Hermann von Schrenk, Kirkwood, Mo. Same, galls on linden, May 4, D. M. Boyd, St Louis, Mo.

Lepidoptera

Aporia crataegi Linn., caterpillars on apple, February 26. Through State Department of Agriculture (French seedlings). Same, larva on French seedlings, June 27, Mr Maney, Geneva. Through Dr G. G. Atwood, State Department of Agriculture

Papilio glaucus var. turnus Linn., tiger swallow tail, larva, August 29, Myra Cole Burns, Middleville

Aglais milberti God., larva on nettle, June, W. J. Hagar, Canajoharie

Sphecodina abbotii Swain, Abbot's sphinx, larvae on grape, July 24, B. E. Parrott, Albany

Sphinx drupiferarum Abb. & Sm., plum tree sphinx, adult on plum tree, June 23, A. P. Finder, Troy

Samia cecropia Linn., cecropia moth, cocoon, May 31, Dorothy Finder, Troy. Same, adult, June 23, Anthony Phillips, Albany

Callosamia promethea Dru., promethea moth, caterpillar, August 24, J. E. Barkley, Grahamsville

Tropoea luna Linn., luna moth, adult, July 13, Clarence Carr, Hamilton

Telea polyphemus Cram., polyphemus moth, caterpillar, August 31, B. W. Smith, Breakabeen

Automeris io Fabr., io caterpillar on maple, August 23, W. J. Whaley, Albany

Anisota stigma Fabr., spiny oak caterpillar on oak, August 24, Roy Latham, Orient

Anisota rubicunda Fabr., green striped maple caterpillar, August 24, J. E. Barkley, Grahamsville

Hyphantria cunea Dru., fall web worm, larvae on apple, July 9, J. R. Van Buren, Armonk

Isia isabella Sm. & Abb., Isabel tiger moth, adult, January 20, L. F. Strickland, Lockport

Diacrisia lubricipeda Linn., buff ermine moth, cocoon on birch seedlings, February 3, Geneva. Through State Department of Agriculture

Apatela americana Harr., larva, August 24, J. E. Barkley, Grahamsville

Acronycta rumicis Linn., cocoons on rose, March 13. Through State Department of Agriculture

Halisidota tessellaris S. & A., hickory tussock caterpillars, on black walnut, September 19, Howard E. Sherwood, East Setauket

Halisidota maculata Harr., oak tussock caterpillar on plane tree, September 4, John Dunbar, Rochester. Same, August 30, J. A. Thomson, Rochester. Same, larva on oak, September 22, John Dunbar, Rochester. Same, larvae, September 24, Miss M. E. Hale, Elizabethtown

Halisidota caryae Harr., hickory tussock caterpillar on trees and shrubs, July 23, A. F. Lockwood, Penn Yan. Same, caterpillar on apple, August 2, Earl G. Brougham, Walton. Same, caterpillar, August 24, J. E. Barkley, Grahamsville. Same, caterpillar, August 27, Mrs D. B. Garnsey, Hague on Lake George. Same, September 4, Frank Roper, Hudson Falls. Same, September 24, Miss M. E. Hale, Elizabethtown. Same, larva on hickory, October 1, George A. Lintner, Summit, N. J.

Paragrotis ochrogaster Guen., red backed cut worm, September 5, J. D. Detweiler, Mineola

Heliophila unipuncta Haw., army moth caterpillars, June 27, Mr Maney, Geneva. Through Dr G. G. Atwood, State Department of Agriculture. Same, larvae on grass, June 26, Roy Latham, Orient

Hadena turbulenta Hübn., caterpillar on smilax, August 24, Roy Latham, Orient

Noctua c-nigrum Linn., spotted cut worm, on cranberry, July 21, R. C. Parker, Riverhead

Mamestra picta Harr., zebra caterpillar, on cabbage, September 12, Daniel P. Crandall, Belfast

Papaipema nitela Guen., stalk borer, larva on potato, June 26, George M. Angell, Chatham. Same, larva on potato, July 2, T. W. Billings, Norwich. Same, larva on potato, July 19, J. L. Lorenzetly, Niagara Falls

Datana ministra Dru., yellow-necked apple worm, August 3, E. R. Zimmer, Owego. Same, caterpillar, August 13, Aaron Hunt, Hillsdale. Same, caterpillar on apple, August 20, M. V. Kimmey, Selkirk. Same, young caterpillars on apple, August 21, Alyda F. Miller, East Greenbush. Same, August 31, J. F. Eastman, Binghamton

Datana angusii Grt. & Rob., caterpillar on hickory, August 20, M. V. Kimmey, Selkirk

Datana integerrima Grt. & Rob., black walnut worm, on Japanese walnut, August 15, F. J. Whaley, Albany

Nadata gibbosa Sm. & Abb., larva on apple, August 3, Hiram Burritt, Middletown

Schizura concinna Sm. & Abb., red humped apple tree caterpillar, on apple, August 7, David Carswell, Greenwich. Same, caterpillar on apple, August 3, Hiram Burritt, Middletown

Alsophila pometaria, fall canker worm, eggs on soft maple, January 31, Patchogue. Through State Department of Agriculture

Notolophus antiqua Linn., rusty tussock moth, eggs, January 29, J. A. Thomson, Rochester

Hemerocampa leucostigma Sm. & Abb., white marked tussock moth caterpillar on elm, July 14, Henry C. Morse, Oneida

Erannis tiliaria Harr., 10-lined inch worm, larva on French seedlings, June 27, Mr Maney, Geneva. Through Dr G. G. Atwood, State Department of Agriculture

Ennomos magnarius Linn., notch wing, egg on apple, April 18, M. C. Albright, Athens

Sibine stimulea Clem., saddleback caterpillar, September 8, L. A. Muckle, Spring Valley

Phobetron pithecium Sm. & Abb., hag moth caterpillar, September 16, F. J. Rimoldi, Albion. Same, larva, September 9, Rev. H. B. Hawkins, New Haven. Same, caterpillar, September 5, J. D. Detweiler, Mineola. Same, caterpillar, August 31, Frank Jesse, Newburgh. Same, August 24, H. V DeMott, Canandaigua. Same, August 30, F. H. Lacy, Poughkeepsie. Same, August 31, Frank Jesse, Newburgh. Through State Department of Agriculture

Crambus laqueatellus Clem., paneled close wing, adult on lawns and pastures, June 23, Roy Latham, Orient

Archips cerasivorana Fitch, ugly nest cherry worm on choke cherry, July 30, Forestport. Through H. C. Morse, Utica

Archips fervidana Clem., oak tortrix, larvae on oak, July 23, C. H. Zimmer, Westbury

Hemerophila pariana Clerck, apple and thorn skeletonizer, larvae and work on apple, August 14, Thomas E. Johnston, Ardsley

Depressaria heracliana DeGeer, wild parsnip web worm, adult, August 13, Elizabeth Boomhower, Greenville. Same, larvae on wild parsnips, July 7, Roy Latham, Orient

Coleophora limosipennella Dup., European elm case bearer, larvae on elm, March 19, Frank Bailey, Locust Valley

Laspeyresia molesta Busck., work on peach twigs, July 10, Clinton C. Lawrence, Stamford, Conn.

Odonata

Aeschna umbrosa Wlk., adults, September 17, John J. Wieser, Albany

Hemiptera

Ormenis pruinosa Say, lightning leaf hopper, young and adults on elm, August 3, N. G. Farber, Troy. Same, adult on elm, August 27, Matthew M. Bagg, Watertown

Typhlocyba rosae Linn., rose leaf hopper, adult and work on rose, June 29, Mr Johnson, Schenectady. Through S. J. Judd

Chermes abietis Linn., spruce gall aphid, gall on spruce, October 3, N. L. Thron, Buffalo

Chermaphis pinicorticis Fitch., pine bark aphid, adult on pine, May 25, W. J. Hagar, Canajoharie. Same, adult on pine, July 25, John Nill, Star Lake

Aphis armoraciae Cowen, nasturtium aphis, adults on nasturtium, July 16, R. C. Parker, Riverhead

Mindarus abietinus Koch., pine and balsam aphid, eggs on white pine, January 31, Hollister, Mass. Through State Department of Agriculture

Chionaspis americana Johns., elm scurfy scale, eggs on elm, November 14, J. J. Levison, New York City

Chionaspis pinifoliae Fitch., scurfy pine leaf scale, eggs and young on Pinus cembra, May 11, S. G. Harris, Tarrytown

Chionaspis euonymi Comst., Euonymus scale on Euonymus japonicus, January 15, Jeremiah Robbins, Babylon

Pseudococcus citri Risso., mealy bug, on coleus, Mary C. Edwards, Albany

Pseudococcus comstocki Kuw., mealy bug, on osage orange, October 19, J. Jas. de Vyver, New York

Eriococcus azaleae Comst., azalea bark scale, on azalea, April 13, C. H. Zimmer, Long Island. Through State Department of Agriculture

Toumeyella liriodendri Gmel., tulip tree scale on tulip, August 1, Flushing Nurseries, Flushing

Anasa tristis Deg., squash bug, adults and young on squash, August 6, B. J. Koch, East Aurora

Dermaptera

European earwig, Forficula auricularia Linn. Numerous adults, August 30, Hattie C. Wallenwein, East Aurora

Orthoptera

Mantis religiosa Linn., European praying mantis, adult, September 22, H. W. Dye, Williamson

Scudderia curvicauda DeGeer., katydid, adult, September 24, Harry C. Morse, Utica

Thysanoptera

Heliothrips haemorrhoidalis Bouche, adults on maple, July 9, H. G. Chapin, Watkins

Anaphothrips striatus Osborne, grass thrips, adult and work on oats, July 24, Orrin M. Smith, Albion

Corrodentia

Psyllopsocus ramburi Selys, adult in apartment house, June 13, A. D. Holmes, New York City

Thysanura

Isotoma minuta Tullb., adult in hotbed, June 7, M. C. Phillips, Red Hook

Arachnida

Ixodes cookei Packard, adult on man, July 12, Charles N. Gilbert, Albany

Eriophyes pyri Nal., pear blister mite, galls on pear, July 26, D. F. Putnam, Cazenovia

The following are a part of a special collection contributed September 1917 by S. H. Burnham, Hudson Falls, N. Y.: Trichiosoma confusum ? McG., Xyloryctes satyrus Fabr., Megalodacne heros Say, M. fasciata Fabr., Penthe pimelia Fabr., Spogostylum limatulus Say, Basilarchia astyanax Fabr., Catocala habilis Grote, Haploa clymene Brown, Apantesis arge Dru., Macaria minorata Pack., Conocephaloides ensiger Harr.

EXCHANGE

Ceratorrhina polyphemus Fabr., Scarabaeid unidentified, Diplognatha gagates Fabr., Heterorhina africana Dru., Cerambicid unidentified, Sternotomis variabilis Qued., Rhyncophorid unidentified and Rhyncophorus phoenicis, all from Campala, Uganda, through Prof. H. T. Fernald, Amherst, Mass.

APPENDIX

A STUDY OF GALL MIDGES, VI

FAMILY ITONIDIDAE

TRIBE ITONIDIDINARIAE

The more characteristic males of this tribe are easily distinguished by the long, slender, thickly haired antennae with 14 or more segments, the flagellate segments usually being binodose and provided with 2 or 3 circumfili, the characteristic loops frequently being greatly produced. The palpi vary from uniarticulate to quadriarticulate. The third vein may unite with the margin well before the apex as in Arthrocnodax or at or well beyond the wing tip as in many other species. The claws may be simple or toothed. This group presents great and exceedingly interesting variations, not only in antennal but also in genitalic structures, the latter most extreme in certain species.

Members of this tribe appear to live largely in the more tender leaf or bud tissues though a considerable number are inquilines, while relatively few subsist upon fungus or are zoophagous.

Key to Genera, Males

Group 1, *Bifili*

This group is easily recognized by the presence of but 2 circumfili on the flagellate antennal segments of the male, the nodes being equal or nearly so.

a Flagellate antennal segments of the male all binodose
  b Palpi quadriarticulate
    c Claws on all legs toothed, wings with greatly produced and broadly rounded areas posteriorly.................. Erosomyia Felt
    cc Claws of anterior legs toothed, the wings normal, the posterior areas not greatly produced........................ Toxomyia Felt
    ccc Claws all simple
      d Wings of the male with the posterior area greatly produced and broadly rounded................ Lobopteromyia Felt
      dd Wings normal, neither especially broadened or narrowed
        e Costa thickly clothed with scales, the first antennal segment with a dorsal tooth................. Endaphis Kieff.
        ee Costa not scaled
          f Third vein interrupting the margin at the apex of the wing; ovipositor long, slender.. Contarinia Rond.
          ff Third vein not interrupting the margin at its union with costa, ovipositor usually not long.................. Thecodiplosis Kieff.

bb Palpi triarticulate
  c Basal clasp segment lobed apically
    d The lobe long, greatly produced, narrowly triangular, terminal clasp segment normal................Dentifibula Felt
    dd The lobe broadly rounded, not greatly produced, terminal clasp segment irregular and pectinate apically....................
Pectinodiplosis n. g.

Group 2, Trifili

This group is easily recognized by the presence of 3 more or less developed circumfili on the flagellate antennal segments of the male, the nodes usually being unequal and sometimes very unequal.

a Claws toothed on all the legs
  b Palpi quadriarticulate
    c Basal clasp segment with a basal lobe
      d Flagellate antennal segments of the male trinodose, the terminal clasp segment much produced, plainly longer than the basal clasp segment, ovipositor short, the lobes orbicular...........
Youngomyia Felt
    cc Basal clasp segment without a distinct basal lobe (presumably)
      d Claws curved nearly at right angles, the palpi long or moderately long, dorsal and ventral plates short, broadly and deeply emarginate...........................Thomasia Rubs.
      dd Claws not strongly curved basally and therefore not forming almost a right angle, genus known only in the female and presumably belonging here
        e Ovipositor slightly protractile, the lobes long, curved and with 2 or 3 longitudinal, subventral rows of obtuse spines......................Dicrodiplosis Kieff.
  bb Palpi triarticulate
    c Basal clasp segment not lobed, the flagellate antennal segments sharply constricted and with distinct stems. Circumfili moderately short and rather thick.............Kalodiplosis Felt
    cc Basal clasp segment distinctly lobed, the flagellate antennal segments without sharply defined constrictions, the basal portion of the stem almost wanting, the circumfili moderately short and somewhat slender...........................Peridiplosis n. g.
aa Claws on the anterior legs and sometimes those of the middle legs toothed, those of the posterior legs simple
  b Palpi quadriarticulate
    c Circumfili with one or more greatly produced bows or loops having a length five to ten times that of the enlargement and extending at approximately right angles to it
      d Three well-developed circumfili, the ventral plate large, oval, as long or a little longer than the dorsal plate..................
Aphidoletes Kieff.
      dd Two well-developed, irregular circumfili, the basal circumfilum on the distal enlargement low, not greatly produced........
Bremia Rond.

cc Circumfili nearly regular and without one or more greatly produced bows or loops
  d Basal clasp segment lobed
    e The lobe apical, setose or spinose and the terminal clasp segment subapical................Lobodiplosis Felt
    ee The lobe basal, setose or nearly glabrous
      f Ventral plate or harpes strongly chitinized............ Coquillettomyia Felt
      ff Ventral plate and harpes as in Lestodiplosis and not chitinized......................Feltiella Rubs.
  dd Basal clasp segment not distinctly lobed
    e Terminal clasp segment subfusiform, distinctly dilated, harpes strongly chitinized and very complex........... Karschomyia Felt
    ee Terminal clasp segment not as above
      f Claws curved nearly at right angles, ventral plate greatly elongate and emarginate apically, dorsal plate deeply cleft and triangularly emarginate........... Clinodiplosis Kieff.
      ff Claws not strongly curved and therefore not forming almost a right angle, ventral plate not greatly produced, the lobes of the dorsal plate not divided, cleft or triangularly emarginate, the female flagellate antennal segments with normal, low circumfili, the ovipositor short..........Mycodiplosis Rubs.
bb Palpi triarticulate
  c Terminal clasp segment not greatly produced, ventral plate short and broad.............................Diadiplosis Felt
aaa Claws simple or not toothed on any of the legs
  b Palpi quadriarticulate
    c Third vein uniting with the margin before the apex of the wing
      d The stems of the flagellate antennal segments mostly with a length less than the diameter, the circumfili rather short, ventral plate deeply bilobed, not greatly produced......... Arthrocnodax Rubs.
    cc Third vein uniting with costa beyond the apex of the wing
      d Circumfili with short bows or wanting
        e Some of the flagellate antennal segments cylindric
          f Circumfili rudimentary or wanting, the 10th to the 14th segments cylindrical, the harpes somewhat inflated....................Prodiplosis Felt
          ff Circumfili distinct though low, all the flagellate or only the distal antennal segments cylindrical, male antennae about as long as the body, ovipostor short Caryomyia Felt
        ee Flagellate antennal segments binodose in the male
          f Stems of the flagellate antennal segments very short, transverse, antennae about as long as the body, the ovipositor short..............Caryomyia Felt

dd Circumfili well developed and not conspicuously irregular, the loops mostly as long or longer than the diameter of the enlargement
  e Claws bent at nearly right angles, basal clasp segment not lobed
    f Ventral plate long, slender, slightly expanded and roundly emarginate apically, dorsal plate short, triangularly emarginate.....Giardomyia Felt
    ff Ventral plate long, broad, very deeply and broadly emarginate, the dorsal plate deeply and roundly emarginate............Hyperdiplosis Felt
  ee Claws not bent at right angles
    f Basal clasp segment lobed
      g The lobe apical
        h The lobe very long, curved, setose, the terminal clasp segment swollen basally.... Epidiplosis Felt
        hh The lobe triangular, the terminal clasp segment short, greatly constricted near the middle and enormously swollen and recurved apically...Metadiplosis Felt
      gg The lobe basal, triangular, wings usually spotted Lestodiplosis Kieff.
    ff Basal clasp segment not conspicuously lobed
      g Antennal segments plainly trinodose, the dorsal plate divided, its lobes orbicular.............. Obolodiplosis Felt
      gg Antennal segments short, thick, the stems transverse, the enlargement short, broad, the circumfili fine, rather short, each with numerous, about 20 loops....Retinodiplosis Kieff.
      ggg Without the striking characters listed under *g* and *gg*
        h Ventral plate linear, usually rounded apically, the dorsal plate much shorter than the ventral plate and with truncate lobes Parallelodiplosis Rubs.
        hh Ventral plate broad and broadly or triangularly emarginate
          i Ventral plate lobes not linear and parallel
            j Dorsal plate deeply incised, the lobes narrowly rounded, the terminal clasp segment with a broadly chitinized, serrate margin............ Paradiplosis Felt
            jj Dorsal plate not incised or very narrowly emarginate, terminal clasp segment as long or nearly as long as the basal clasp segment and smooth, the ovipositor moderately long and with lobes.....Itonida Meign.

bb Palpi triarticulate

c Circumfili with short bows or loops, their length being one-half the diameter of the enlargement or less

d Thorax plainly extending over and concealing the head, at least to a considerable extent

e Males with 15 to 27 or possibly more antennal segments, females with 14 or more antennal segments, the flagellate segments of the female usually strongly constricted; ovipositor short, species mostly large................. Hormomyia H. Lw.

ee Male and female with 14 or 15 (15th rudimentary) antennal segments, the flagellate segments of the female cylindrical and mostly with three circumfili, the ovipositor moderately long, species medium to small............ Trishormomyia Kieff.

dd Thorax not produced over the head to a marked degree

e Flagellate antennal segments of the male binodose or cylindrical

f Third vein uniting with the margin near the apex, wings rather short, broad, the male antennae about as long as the body, the ovipositor short.......... Caryomyia Felt

cc Circumfilar loops with a length equal to the diameter of the enlargement or longer

d Basal clasp segment lobed, ventral plate chitinized and denticulate, genitalia moderate in size....................... Odontodiplosis Felt

dd Basal clasp segment not distinctly lobed

e Third vein uniting with the margin beyond the apex of the wing, dorsal plate deeply and narrowly incised, ventral plate broad and rounded....Adiplosis Felt

bbb Palpi uniarticulate

c Wings hyaline

d Fourteen antennal segments in both sexes, the third and fourth not fused, the basal and distal enlargements globose and pyriform, respectively; dorsal and ventral plates deeply emarginate, the ovipositor short, chitinous, falcate......... Monarthropalpus Rubs.

dd Fourteen antennal segments in the female, the fifth with a stem one-third the length of the basal enlargement, which latter has a length two and one-half times its diameter; third and fourth free; ovipositor stout, with a length one-half that of the abdomen, the distal part thickly clothed with long, silky hairs; male unknown..........Onodiplosis Felt

ddd Thirteen antennal segments in the female, the third and fourth fused, the basal and distal nodes globose and ovoid, respectively; dorsal and ventral plates bilobed; ovipositor stout, chitinous, needlelike............Cystodiplosis Kieff.

cc Wings black and yellow marked

d Basal and distal enlargement of the flagellate antennal segments globose and cylindrical, respectively; harpes forming a spinose, chitinous tube surrounding the style; ovipositor short, its lobes lanceolate.........Astrodiplosis Felt

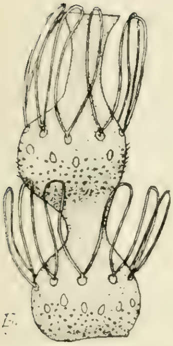

Fig. 10 Erosomyia mangiferae, fifth antennal segment of male (enlarged, original)

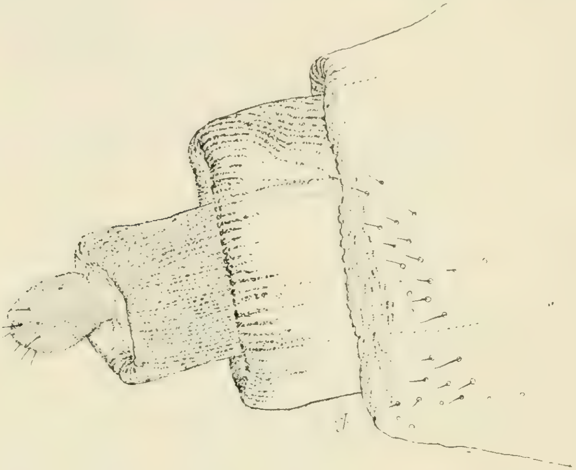

Fig. 11 Erosomyia mangiferae ovipositor and tip of abdomen of female (enlarged, original)

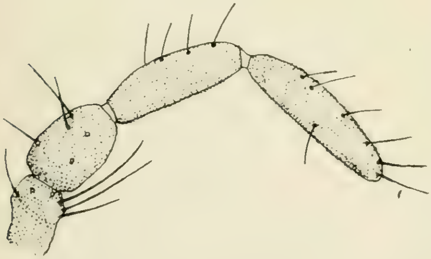

Fig 12. Erosomyia mangiferae, palpus of male (enlarged, original)

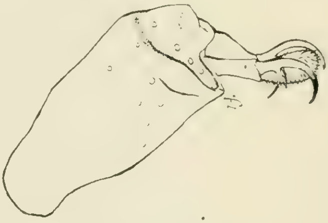

Fig. 13 Erosomyia mangiferae, side view of claw of female (enlarged, original)

Group Bifili

EROSOMYIA Felt

1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:49
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 172

The broad wings and the somewhat produced anal angle in connection with the short basal portion of the stem in the flagellate antennal segments of the male indicate a relationship to Lobopteromyia Felt from which it is easily separated by the distinctly toothed anterior claws. Type E. mangiferae Felt.

Erosomyia mangiferae Felt

1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:49–50

The midge was reared by W. H. Patterson, St Vincent, W. I., from presumably blister galls on very young leaves of Mangifera indica.

Toxomyia Felt

1911 **Felt, E. P.** Ent. News, 22:302

1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 173

The unidentate anterior claws and the 2 circumfili indicate a relationship to Erosomyia Felt from which it is easily separated by alar characters. The genitalia approach in structure those of Thecodiplosis. Type T. fungicola Felt.

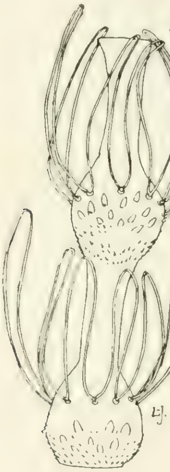

Fig. 14 Toxomyia rubida, fifth antennal segment of male (enlarged, original)

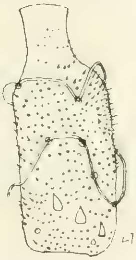

Fig. 15 Toxomyia rubida, fifth antennal segment of female (enlarged, original)

Key to Species

a Stems of the fifth antennal segment of the male with a length two and one-half and three and one-half times their diameters, respectively
  b Body pale yellowish, length .75 mm; dorsal plate short, roundly and triangularly emarginate, the lobes broadly truncate.................. fungicola Felt, C. a2134
  bb Mesonotum yellowish brown; abdomen yellowish orange, length 1 mm; dorsal plate short, broad, broadly emarginate, the lobes obliquely truncate..................................rubida Felt, C. a2140

aa Stems of the fifth antennal segment of the male with a length three and four and one-fourth times their diameters, respectively

b Mesonotum reddish brown; abdomen fuscous yellowish, length 1 mm... americana Felt, C. 1485

Toxomyia fungicola Felt

1911 **Felt, E. P.** Ent. News, 22:302–3

This small, yellowish midge was reared February 3, 1911, by W. H. Patterson, St Vincent, W. I., from the teleutospores of Puccinia species on Emilia sonchifolia.

Toxomyia rubida Felt

1911 **Felt, E. P.** Can. Ent., 43:194–95

The midge is allied to the preceding and was reared February 1911, by W. H. Patterson, St Vincent, W. I., from the aecidiospores of Uromyces pisi on the leaves of Euphorbia pilulifera.

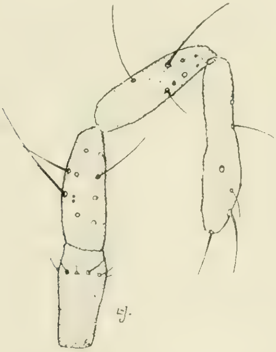

Fig. 16 Toxomyia rubida, palpus of male (enlarged, original)

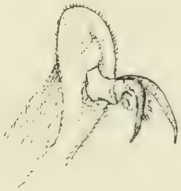

Fig. 17 Toxomyia rubida, side view of claw of female (enlarged, original)

Toxomyia americana Felt

1914 **Felt, E. P.** N. Y. Ent. Soc. Jour., 22:130

Nothing is known of the habits of this species, aside from its having been taken August 21, 1909, by C. P. Alexander in a bog swamp at Woodworth's lake in the Adirondacks, altitude 1570 feet.

LOBOPTEROMYIA Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 389
1910 **Rubsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:284
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:49
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 176

This genus comprises a number of very distinct forms easily separable from Contarinia, to which they are closely related, by the broad wings. These organs have a conspicuous, broadly rounded extension posteriorly, the width being about two-thirds the length (plate 6, figs. 5–7). The antennae of the male are peculiar in that the basal portion of the stem on the flagellate segments rarely has a length equal to its diameter. The enlargements are relatively large, subglogose, and the circumfili rather short, stout and uniform.

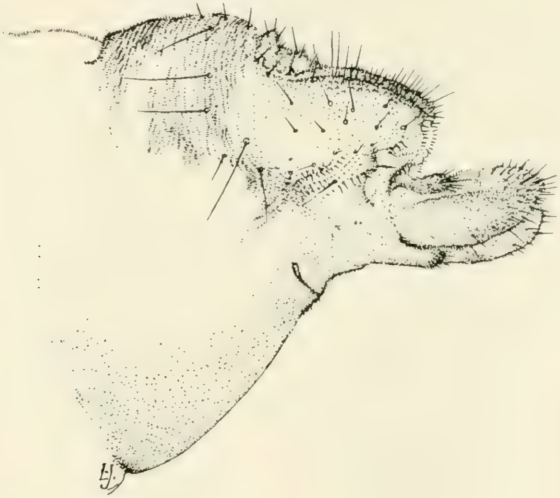

Fig. 18 Toxomyia rubida, tip of abdomen and ovipositor of female (enlarged, original)

The female has relatively narrow wings, with a length about twice the width and almost subsessile antennal segments, the stem of the fifth being about one-fourth the length of the basal enlargement. There are two low circumfili, the distal filum forming small apical loops. The ovipositor is stout, about one-half the length of the abdomen and with a moderately long terminal lobe not constricted basally.

Type Contarinia filicis Felt.

Key to Species

a Abdomen yellowish
  b Basal portion of the stem of the fifth antennal segment with a length about one-half its diameter
    c Mesonotum yellowish and slaty brown; the distal portion of the stem of the fifth antennal segment with a length two and one-half times its diameter, slightly expanded apically; the basal clasp segment stout, tapering slightly.....filicis Felt, C. 20
    cc Mesonotum sooty yellow; the distal portion of the stem of the fifth antennal segment with a length one-half greater than its diameter, slightly expanded apically; basal clasp segment stout, broadly rounded apically.............apicalis Felt, C. 52
    ccc Mesonotum dark brown; the distal portion of the stem of the fifth antennal segment with a length twice its diameter, greatly expanded distally; the basal clasp segment short, broad, tapering strongly.....................foetedi Felt, C. 24
  bb The basal portion of the stem of the fifth antennal segment with a length one-half greater than its diameter
    c Mesonotum reddish brown; the distal portion of the stem of the fifth antennal segment with a length three times its diameter; the basal clasp segment short, stout and tapering strongly..... symplocarpi Felt, C. 23
aa Abdomen yellowish red
  b Mesonotum dark brown; the basal portion of the stem of the fifth antennal segment with a length only one-half its diameter; the basal clasp segment short, stout and roundly tapering distally........... consobrina Felt, C. 61
aaa Abdomen light brown; the basal portion of the stem of the fifth antennal segment with a length one-half its diameter
  b Mesonotum dark brown; basal clasp segment very short, stout and roundly tapering apically....................tiliae Felt, C. 25
  bb Mesonotum light brown; the basal clasp segment very short and stout caricis Felt, C. 19
aaaa Abdomen reddish brown
  b Mesonotum yellowish brown; the basal portion of the stem of the fifth antennal segment with a length one-half its diameter; the basal clasp segment short, stout and narrowly rounded apically.... abdominalis Felt, C. 16

Lobopteromyia filicis Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 131; separate, p. 20 (Contarinia)

1908 ———— N. Y. State Mus. Bul. 124, p. 390

The yellowish midges were taken on ferns May 16, 1906 at Karner, N. Y.

Male. Length 1.5 mm. Antennae longer than the body, thickly fine haired, light brown; 14 segments, the fifth with stems one-half and two and one-half times their diameters respectively; terminal segment with the basal enlargement somewhat flattened, the distal prolonged, obtuse. Palpi; the first segment short, subquadrate, slightly swollen distally, the second stouter, a little longer, the third

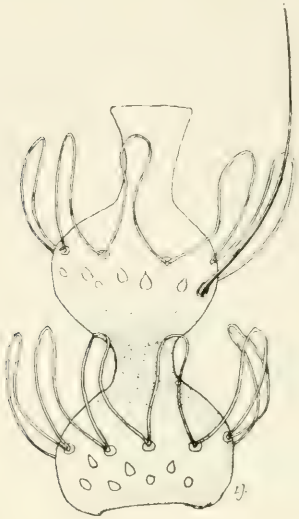

Fig. 19 Lobopteromyia filicis, fifth antennal segment of male (enlarged, original)

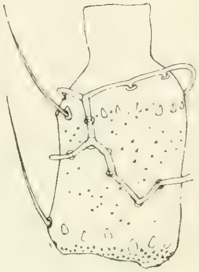

Fig. 20 Lobopteromyia filicis, fifth antennal segment of female (enlarged, original)

one-half longer than the second, more slender and the fourth nearly twice the length of the third. Mesonotum yellowish, with a broad,

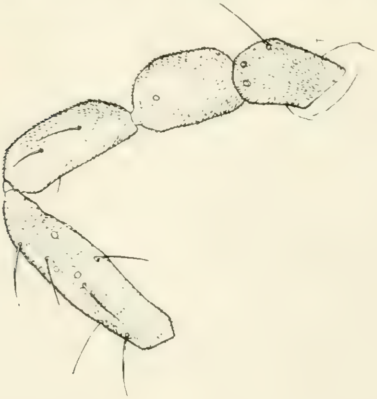

Fig. 21 Lobopteromyia filicis, palpus of male (enlarged, original)

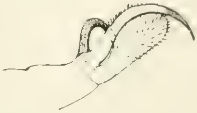

Fig. 22 Lobopteromyia filicis, side view of claw of male (enlarged, original)

edian area anteriorly; broad sublateral areas not quite extending o the anterior margin and the scutellum slaty brown. Abdomen yellowish. Wings hyaline, very broad, costa yellowish transparent. Halteres yellowish transparent. Legs yellowish transparent ventrally, light brown dorsally, particularly the mid tibiae and tarsi; claws slender, strongly curved. Genitalia; basal clasp segment stout; terminal clasp segment swollen basally; dorsal plate broad, broadly and slightly emarginate; ventral plate broad, the deep emargination broadly rounded at base; lobes broadly rounded.

Female. Length .8 mm. Antennae about one-half as long as the body, sparsely haired, light brown; 14 segments, the fifth with a stem one-fourth the length of the cylindric basal enlargement, which latter has a length two and one-half times its diameter; terminal segment produced, the basal portion cylindric, with a length three times its diameter and apically with a stout, knoblike process. Palpi; first segment subquadrate, the second broadly oval, the third with a length three times its diameter, the fourth one-half longer than the third; face yellowish. Mesonotum yellowish brown, submedian lines yellowish, setose. Abdomen yellowish brown. Wings hyaline with a length about twice the width; halteres and legs yellowish transparent, the tarsi slightly fuscous; claws slender, strongly curved, the pulvilli as long as the claws. Ovipositor stout, about half the length of the abdomen; terminal lobe with a length twice its width. Type Cecid. 20. (See plate 6, fig. 7 and plate 10, fig. 2)

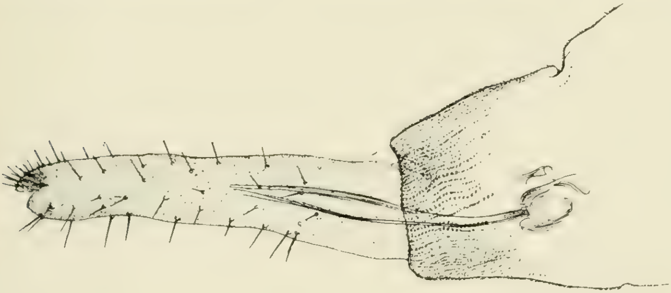

Fig. 23 Lobopteromyia filicis, side view of last abdominal segment and ovipositor of female (enlarged, original)

Lobopteromyia apicalis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 390

The yellowish males described below and taken May 18, 1906 on basswood, Tilia americana, at Albany, N. Y., in association with females, presumably cospecific, may be identical with the Cecidomyia verrucicola O. S.

Male. Length 1.25 mm. Antennae pale straw, longer than the body; 14 segments, the fifth having the stems one-half and one and one-half times their diameters, respectively, the terminal segment with the basal enlargement slightly produced, pyriform, the distal enlargement produced, broadly fusiform. Palpi; the first segment short, stout, irregularly quadrate, the second a little longer, roundly rectangular, the third one-half longer, more cylindric, the fourth one-half longer and more slender than the third, strongly tapering distally. Mesonotum sooty yellowish. Scutellum a little lighter, postscutellum darker. Abdomen yellowish, darker at the extremities. Wings hyaline, costa yellowish brown. Halteres yellowish transparent. Legs yellowish brown; claws long, slender, evenly curved; pulvilli nearly as long as the claws. Genitalia; basal and terminal clasp segments short, stout; dorsal plate short, stout, deeply, roundly and narrowly emarginate, the lobes broad; ventral plate long, tapering, triangularly emarginate, the lobes narrowly rounded.

Female. Length 1.25 mm. Antennae pale straw, about one-half the length of the body; 14 segments, the fifth with the stem about one-fourth the length of the subcylindric basal enlargement, which latter has a length one-half greater than its diameter; terminal segment reduced, broadly oval. Palpi; first segment subquadrate, the second a little longer, broader, the third one-half longer than the second, more slender, the fourth one-third longer than the third. Wings with a length nearly twice the width, plainly narrower than in the male. Ovipositor scarcely half the length of the abdomen, the basal segment thick, with a length one-half greater than its diameter, the distal segment short, with a length about four times its diameter and apically with indistinct, narrowly rounded, setose lobes. Color characters nearly as in the male.

This species is based upon the male, the association of the female being provisional only. Type Cecid. 52.

Lobopteromyia foetedi Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 390

The yellowish male with a dark-brown mesonotum was taken May 16, 1906 on skunk cabbage, Symplocarpus foetidus, at Karner, N. Y.

Male. Length .75 mm. Antennae light brown and a little longer than the body, thickly clothed with fine hairs, 14 segments, the fifth with stems one-half and two times their diameters respectively. Palpi; the first segment short, stout, subquadrate, the second a little longer, roundly rectangular, the third one-half longer than the second, tapering at both extremities, rather slender, the fourth one-fourth longer than the third and a little stouter. Mesonotum dark brown, scutellum reddish brown, abdomen yellowish transparent, wings hyaline, costa brownish; halteres and legs yellowish transparent, the tarsi with a few irregular dark markings, claws long, evenly curved, the pulvilli nearly as long as the claws. Genitalia; basal clasp segment short, broad; terminal clasp segment short, stout; dorsal plate short, broad, deeply and triangularly incised, the lobes subacute; ventral plate long, stout, deeply and roundly emarginate, the lobes narrowly rounded. Type Cecid. 24.

Lobopteromyia symplocarpi Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 390

This yellowish species was taken May 16, 1906 on skunk cabbage, Symplocarpus foetidus, at Karner, N. Y.

Male. Length .75 mm. Antennae one-half longer than the body, rather thickly clothed with fine hairs, light brown, 14 segments, the fifth with stems one and one-half and three times their diameter respectively; terminal segment with the basal enlargement subglobose, the distal enlargement somewhat produced and broadly fusiform. Palpi; the first segment short, stout, subquadrate, the second a little longer, roundly rectangular, the third one-half longer than the second, more slender, the fourth one-fourth longer than the third, strongly dilated. Mesonotum reddish brown, scutellum and abdomen yellowish, wings hyaline, costa yellowish brown; halteres and legs yellowish transparent, the tarsi slightly darker. Claws long, slender, strongly curved, the pulvilli a little shorter than the claws. Genitalia; basal clasp segment long, slender; terminal clasp segment short, stout; dorsal plate short, stout, broadly and roundly emarginate, the lobes narrowly rounded; ventral plate short, stout, broadly rounded.

Female. Length 1 mm. Antennae extending to the base of the abdomen, sparsely haired, light brown; 14 segments, the fifth with a stem one-third the length of the cylindric basal enlargement, which latter has a length twice its diameter; terminal segment reduced, narrowly oval, tapering distally. Palpi; first segment subquadrate, the second a little longer, stouter, the third and fourth subequal. Mesonotum reddish brown. Abdomen yellowish transparent. Wings narrower than in the male, the length being twice the width. Halteres and legs yellowish transparent, the tarsi slightly darker; claws slender, evenly curved, simple, the pulvilli as long as the claws. Ovipositor stout, with a length about half that of the abdomen; terminal lobes short, broadly rounded. Type Cecid. 23.

Lobopteromyia consobrina Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 161 (Contarinia)
1908 ———— N. Y. State Mus. Bul. 124, p. 390

This yellowish red male with a dark-brown mesonotum was taken May 16, 1906 on ferns at Karner, N. Y.

Male. Length 1.5 mm. Antennae longer than the body, thickly fine haired, pale yellowish or reddish; 14 segments, the fifth with stems one-half and as long as their diameters respectively; terminal segment with the basal enlargement produced, subconical, the distal enlargement obpyriform, distally tapering to a broadly rounded knob. Palpi; the first segment slightly curved, subquadrate, slightly enlarged distally, the second one-half longer, broadly oval, the third one-fourth longer than the second, more slender, and the fourth about one-fourth longer than the third, more slender; face yellowish. Mesonotum dark brown. Scutellum reddish, postscutellum fuscous mesially, yellowish laterally. Abdomen yellowish red, fuscous laterally. Wings hyaline, costa light reddish. Halteres yellowish at base, fuscous apically. Coxae, femora and tibiae pale yellowish, tarsi yellowish or variably suffused with carmine; claws stout, uniformly curved. Genitalia; basal clasp segment short, stout; terminal clasp segment much swollen at the basal third; dorsal plate short, broad, deeply and narrowly incised, the lobes obliquely truncate; ventral plate deeply and triangularly emarginate, the lobes broadly rounded. Type Cecid. 61. (See plate 10, fig. 1)

Lobopteromyia tiliae Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 161 (Contarinia)
1908 ———— N. Y. State Mus. Bul. 124, p. 390

This light-brown male was taken May 16, 1906 on basswood, Tilia americana, at Karner, N. Y.

Male. Length 1.5 mm. Antennae a little longer than the body, thickly fine haired, light brown; 14 segments, the fifth with stems one-half and three times their diameters respectively; terminal segments with the basal enlargement slightly produced and rather narrowly separated from the prolonged, fusiform distal enlargement, which latter has an acute apex. Palpi; the first segment short, subquadrate, second a little longer, stout, swollen distally, the third oval, a little longer than the second, the fourth a little longer than the preceding and the fifth one-half longer than the fourth. Mesonotum dark brown. Scutellum orange brown. Abdomen light brown. Wings hyaline, costa reddish; halteres yellow and reddish transparent. Legs, coxae, femora and tibiae mostly yellowish transparent, extremity of tibiae and tarsi with a distinct reddish cast; claws stout, strongly curved, simple. Genitalia; basal clasp segment stout; terminal clasp segment stout; dorsal plate broad, deeply emarginate, the lobes truncate; ventral plate broad, deeply emarginate, lobes obliquely rounded. Type Cecid. 25. (See plate 6, fig. 5)

Lobopteromyia caricis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 390

The male is light brown and was taken May 16, 1906 on sedge, Carex stricta, at Karner, N. Y.

Male. Length 1.66 mm. Antennae nearly as long as the body, thickly fine haired, light brown; 14 segments, the fifth with stems one-half and two and one-half times their diameters respectively, the distal enlargement broadly fusiform. Palpi; the first segment short, stout, subquadrate, the second one-half longer, roundly subrectangular, the third one-half longer than the second, slender, tapering at each extremity, the fourth a little longer than the third. Mesonotum and abdomen light brown, genitalia darker, wings hyaline, costa dark brown; halteres yellowish transparent, legs yellowish brown, the tarsi a little darker; claws long, evenly curved, simple, the pulvilli nearly as long as the claws. Genitalia; basal clasp segment short, stout; terminal clasp segment short, stout; dorsal plate short, deeply and narrowly incised, the lobes narrowly rounded; ventral plate short, broad, deeply and triangularly incised, the lobes rounded. Type Cecid. 19.

Lobopteromyia abdominalis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 390

This reddish brown male was swept May 15, 1906 from pine, Pinus strobus, at Albany, N. Y.

Male. Length 1.66 mm. Antennae extending to the fourth abdominal segment, rather thickly haired, light brown; 14 segments, the fifth with stems one-half and two times their diameters respectively; terminal segment, basal enlargement subglobose, the distal one produced, fusiform. Palpi; the first segment short, stout, subquadrate, the second a little longer, broadly ovate, the third one-fourth longer than the second, tapering at both extremities and the fourth one-half longer than the third, more slender. Mesonotum yellowish brown with indistinct submedian lines bearing straw-colored hairs. Scutellum purplish brown, postscutellum reddish. Abdomen reddish brown, sparsely clothed with yellowish hairs. Wings subhyaline, costa brown; halteres yellowish. Coxae and legs yellowish brown, tarsi a little darker; claws long, stout, evenly curved, the pulvilli as long as the claws. Genitalia; basal and terminal clasp segments long, stout; dorsal plate short, broad, deeply, irregularly and triangularly incised, the lobes irregularly rounded; ventral plate long, stout, deeply and triangularly incised, the lobes broadly rounded. Type Cecid. 16. (See plate 6, fig. 6)

Lobopteromyia venae Felt

1910 **Stebbins, F. A.** Springf. Mus. Nat. Hist. Bul. 1, p. 39
1914 **Felt, E. P.** Insecutor Inscitiae Menstruus, 2:120–21

The greenish pouchlike vein galls of this species are locally very abundant on certain thorn bushes, Crataegus, at Nassau, N. Y. It has been recorded from Massachusetts by Miss Stebbins. Dicrodiplosis venitalis Felt, probably Zoophagous, has also been reared from this gall.

ENDAPHIS Kieff.

1896 **Kieffer, J. J.** Ent. Soc. Fr. Bul., 65:382–83
1897 ———— Syn. Cecid. Eur. & Alg., p. 29
1910 **Rubsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:283
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:50
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 171

This genus is allied to Contarinia and may be easily separated therefrom by the toothlike dorsal prolongation of the first antennal segment and the sparse clothing of narrow scales on the wing membrane.

The type species, E. perfidus, is a small form about 1.5 mm long, living as an endoparasite on Aphididae. The first antennal segment has a dorsal prolongation extending to the middle of the second, the third and fourth are fused, the fifth has the basal portion of the stem with a length about equal to its diameter, the distal part with a length nearly twice its diameter. The globose enlargements are nearly equal, each with sparse setae and moderately long, well-developed circumfili. The palpi are quadriarticulate, the fourth being one-half longer than the third. Subcosta unites with the margin near the basal third and the third vein just before the apex of the wing, the fifth at the distal fourth, its branch near the basal half. The claws are long, slender, slightly curved, simple, the pulvilli nearly as long as the claws. Basal clasp segment rather long, slender, the terminal clasp segment long, slender and swollen basally. The dorsal plate appears to be short, broad and broadly emarginate. The ventral plate appears to be deeply and triangularly divided, the lobes tapering to a narrowly rounded apex; the style is long, slender and narrowly rounded. The female ovipositor is short, the lobes long, slender, fingerlike.

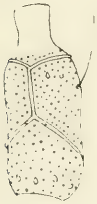

Fig. 24 Endaphis americana, fifth antennal segment of female (enlarged, original)

The above characters are drafted from type specimens, generously donated to the museum by Professor Kieffer. An Indian species, E. hirta Felt,[1] was reared from Dactylopius on Mimusops, Tangalla, Ceylon.

Endaphis americana Felt

1911 **Felt, E. P.** Ent. News, 22:129

The first North American representative of this European genus was reared September 2, 1910 from what appeared to be galls of Eriophyes fraxiniflorae Felt on Fraxinus velutina collected by Dr R. E. Kunze, Prescott, Ariz., August 15, 1910. There was no doubt as to the foliage having been deformed by Eriophyes, since mites were rather abundant and relatively large. There may have been a few aphids in addition. C. a2066.

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[1] 1911 Ent. News, 22:224.

CONTARINIA Rond.

Eudiplosis Kieff.

Stictodiplosis Kieff. sub. gen.

1860 **Rondani, C.** Soc. Sci. Nat. Milano Atti, 2:4, 9
1894 **Kieffer, J. J.** Soc. Ent. Fr. Bul., 58:28 (Eudiplosis and Stictodiplosis)
1896 ——— Wien. Ent. Zeit., 15:94, 98–99
1897 ——— Syn. Cecid. de Eur. & Alg., p. 31
1900 ——— Soc. Ent. Fr. Ann., 69:447
1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 390
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:284
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:51
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 178

This genus, as characterized by earlier writers, has the two nodes of the flagellate antennal segments of the male equal or nearly so, each with one circumfilum. The palpi are quadriarticulate and the pulvilli shorter than the simple claws. The costa is interrupted after its union with the third vein. Both dorsal and ventral plates are deeply bilobed. The ovipositor is long, slender and apparently needle-shaped. Type, Tipula loti DeG.

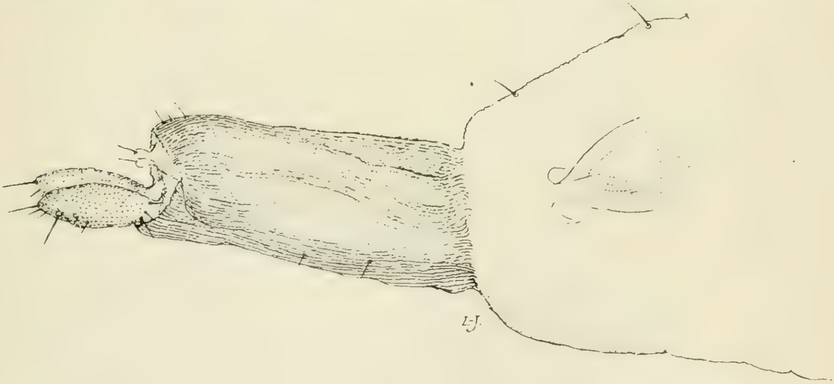

Fig. 25 Endaphis americana, ovipositor of female (enlarged, original)

Key to Species

a Small, yellowish species with very few or no fuscous markings
  b Basal portion of the stem of the fifth antennal segment in the male with a length less than twice its diameter
    c Mesonotum fuscous yellowish, the dorsal plate with the lobes broad, obliquely truncate and sparsely setose. Reared from grape blossoms.......................... johnsoni Sling., a1845
    cc Mesonotum yellowish brown, the dorsal plate with the lobes broad, broadly rounded and sparsely setose apically.................. trifolii Felt, C. 108

ccc Mesonotum reddish brown, the dorsal plate long, deeply and roundly emarginate, the lobes narrowly rounded. Reared from flowers of tomato..................lycopersici Felt, C. a2135, a2090

bb Basal portion of the stem of the fifth antennal segment of the male with a length twice its diameter

c Mesonotum reddish brown, the dorsal plate with lobes long, narrowly rounded and thickly setose apically. Reared from Eupatorium perfoliatum...............perfoliata Felt, C. a1689a

aa Species usually larger and with more color

b Abdomen yellowish or yellowish red

c Mesonotum sooty yellow

d Abdomen fuscous yellowish, sparsely haired, the fifth antennal segment having the basal part of the stem with a length twice its diameter, the distal portion with a length four times its diameter; the fourth palpal segment one-half longer than the third......................flavolinea Felt, C. 231

cc Mesonotum reddish brown

d Abdomen yellowish brown, the fifth antennal segment having the basal portion of the stem one-half longer than its diameter, and distal part a little over twice its diameter; the fourth palpal segment a little longer than the third. Reared from deformed cherries............virginianiae Felt, C. 769

ccc Mesonotum dark brown

d Abdomen fuscous greenish white or yellowish

e Fifth antennal segment with the basal portion of the stem with a length equal to its diameter, the distal part with a length two and one-half times its diameter; the fourth palpal segment a little longer than the third. Reared from Agrimonia...........agrimoniae Felt, a1696

ee Fifth antennal segment with the basal portion of the stem with a length two and one-half times its diameter, the distal part with a length four times its diameter; the fourth palpal segment with a length one-fourth greater than the third. Reared from cotton..................
gossypii Felt, C. 1331

dd Abdomen pale yellowish, the segments narrowly margined posteriorly with fuscous yellow; the two parts of the stem of the fifth antennal segment with a length one-half greater than the diameter; the fourth palpal segment more than twice the length of the third. Reared from Rumex..............
rumicis H. Lw., a1595

ddd Abdomen fuscous yellowish; the fifth antennal segment with the basal portion of the stem with a length one-half greater than its diameter, the distal part with a length two and one-half times its diameter; the fourth palpal segment one-half longer than the third.......divaricata Felt, C. 350

dddd Abdomen pale salmon, the fifth antennal segment with the basal portion of the stem with a length twice its diameter, the distal portion with a length two and one-half times its diameter; the fourth palpal segment twice the length of the third.....................sambucifolia Felt, C. 153

ddddd Abdomen greenish yellow; the fifth antennal segment with the basal portion of the stem two and one-half times its diameter, the distal portion three times its diameter; the third and fourth palpal segments equal...viridiflava Felt, C. 606

dddddd Abdomen yellowish red, the fifth antennal segment with the basal portion of the stem one-fourth longer than its diameter, the distal portion with a length two and one-fourth times its diameter, the fourth palpal segment longer than the third........................spiraeina Felt, C. a2142

bb Abdomen reddish or reddish brown

c The fifth antennal segment with the distal portion of the stem as long as its diameter

d The fifth antennal segment with the distal portion of the stem one-half longer than its diameter; the fourth palpal segment twice the length of the third; the dorsal plate truncate, narrowly incised...........truncata Felt, C. 1202, 1203

dd The fifth antennal segment with the distal portion of the stem with a length three times its diameter; the third and fourth palpal segments equal; the dorsal plate triangularly and broadly emarginate. Reared from Clematis...............
clematidis Felt, a1659b

cc The fifth antennal segment with the basal portion of the stem with a length one-fourth greater than its diameter; the fourth palpal segment a little longer than the third; the dorsal plate triangularly emarginate..........................viatica Felt, C. 105a

ccc The fifth antennal segment with the basal portion of the stem having a length one-half greater than its diameter

d The fifth antennal segment with the distal portion of the stem with a length equal to that of its diameter; the dorsal plate broadly and triangularly emarginate. Reared from sorghum seeds........................sorghicola Coq., C. 972

dd The fifth antennal segment with the distal portion of the stem with a length three and one-half times its diameter

e Terminal clasp segment, slender, normal; the dorsal plate deeply and triangularly incised.......................
ampelophila Felt, C. 9

ee Terminal clasp segment swollen apically; the dorsal plate slightly and triangularly incised.......................
obesa n. sp., C. 1349

cccc The fifth antennal segment with the two portions of the stem with a length two and one-half times the diameter; the fourth palpal segment one-fourth longer than the third; the dorsal plate triangularly incised.......................................
balsamifera Felt, C. 143, 144, 169, 173, 174

bbb Abdomen brown or dark brown

c Abdomen light brown

d Wings unicolorous; the fifth antennal segment with the two portions of the stem each with a length about two and one-half times its diameter; the circumfili long, slender, numerous; the third and fourth palpal segments equal. Reared from pear, Pyrus....................pyrivora Riley, C. 790

dd Wings spotted with fuscous, the fifth antennal segment having the basal portion of the stem with a length one-half greater than its diameter, the distal part with a length three times its diameter; the circumfili with loops rather long and sparse and the fourth palpal segment a little longer than the third... maculosa Felt, C. 599

cc Abdomen dark brown or brownish black

d The fifth antennal segment with the basal portion of the stem having a length equal to its diameter, the distal portion of the stem with a length three times its diameter; the fourth palpal segment one-half longer than the third. Reared from Negundo..........negundifolia Felt,[1] C. 967, ?a1853

dd The fifth antennal segment with the two portions of the stem having a length one-half greater than the diameter; the fourth palpal segment one-half longer than the third. Reared from melon tip.......................setigera Lintn.

ddd The fifth antennal segment with the two parts of the stem having a length two and one-half times greater than the diameter; the fourth palpal segment twice the length of the preceding. Probably reared from Fraxinus................ canadensis Felt, C. 1027

Contarinia coloradensis Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20:240-41

A female, provisionally referred to this genus, was reared from a large budlike deformity on Pinus scopulorum collected by Prof. E. Bethel, Denver, Col. It was also received from Prof. C. P. Gillette, Fort Collins, Col., and was reared again in 1913. This is probably the true gall maker.

Contarinia johnsoni Sling.

Grape Blossom Midge

1904 **Slingerland, M. V. & Johnson, Fred.** Cornell Univ. Agric. Exp. Sta. Bul. 224, p. 71-73 (Cecidomyia)

1908 **Felt, E. P.** Grape Belt (Dunkirk, N. Y.), June 12 (Cecidomyia)
1909 ———— Grape Belt (Dunkirk, N. Y.), May 18
1909 ———— Econ. Ent. Jour., 2:257
1909 ———— N. Y. State Mus. Bul. 134, p. 15-19
1909 ———— Ent. Soc. Ont. 39th Rep't, p. 44
1910 ———— N. Y. State Mus. Bul. 141, p. 92-93
1910 **Hartzell, F. Z.** N. Y. Agric. Exp. Sta. Bul. 331, p. 514-30

This insect was first observed in the Chautauqua grape region in 1904, being then recorded from several towns. It persisted in small numbers and in 1908 destroyed 60 to 75 per cent of the early Moore blossoms in one vineyard at Fredonia. It was generally distributed though not quite so injurious in 1909.

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[1] Possibly the same as Cecidomyia negundinis Gill.

Life history. This midge appears in early June with the unfolding of the blossom buds and deposits its eggs in the florets. These hatch shortly and the yellowish maggots attain maturity within a few days to a week after the injury becomes noticeable. Seven to eight or ten larvae may occur in one blossom bud. The larvae winter in the soil at the base of the vines, sometimes in large numbers.

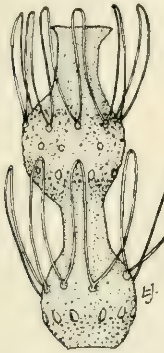

Fig. 26 Contarinia johnsoni, fifth antennal segment of male (enlarged, original)

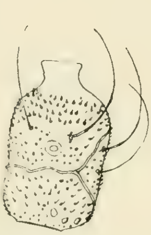

Fig. 27 Contarinia johnsoni, fifth antennal segment of female (enlarged, original)

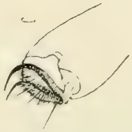

Fig. 28 Contarinia johnsoni, side view of male claws (enlarged, original)

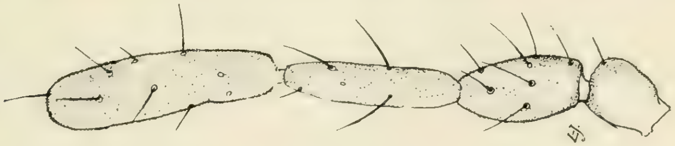

Fig. 29 Contarinia johnsoni, palpus of male (enlarged, original)

The parent fly is a small, yellowish species, the mesonotum fuscous yellowish and the basal portion of the stem of the fifth antennal segment with a length one-half greater than its diameter. The lobes of the dorsal plate are broad, obliquely truncate and sparsely setose apically.

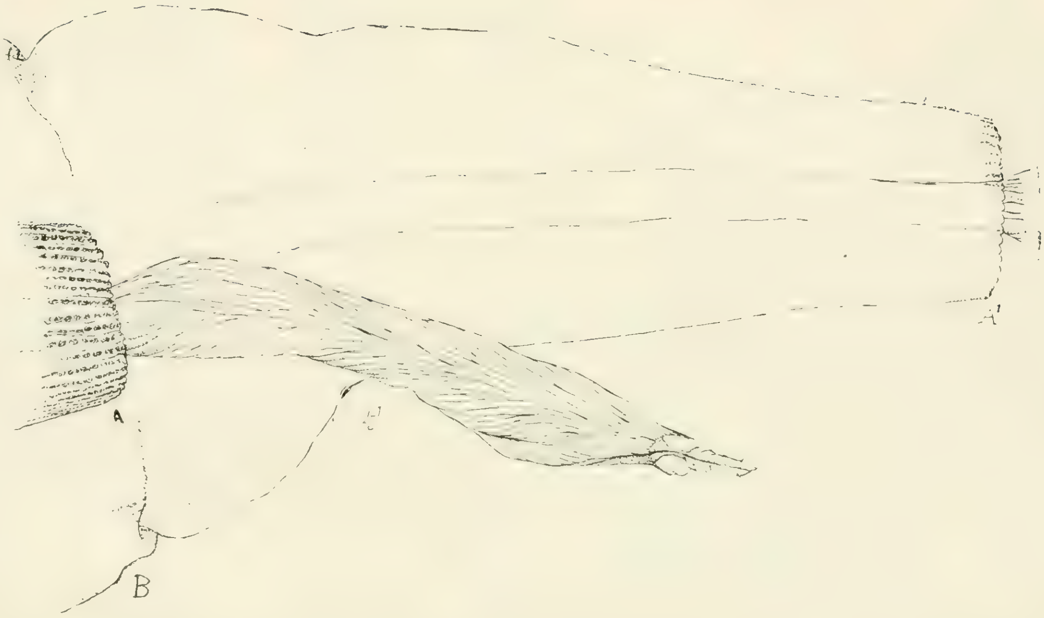

Fig. 30 Contarinia johnsoni, tip of abdomen of female showing extended ovipositor, A being a continuation of A (enlarged, original)

Contarinia lycopersici Felt

1911 **Felt, E. P.** Ent. News, 22:303-4

This species was reared by William H. Patterson of the Agricultural School, St Vincent, W. I., from flowers of tomatoes, Lycopersicum esculentum, and appears to be closely allied to C. solani Rübs. A type of the female of the latter species was kindly placed at our disposal by Professor Rübsaamen. A comparison of the two shows the St Vincent form to have distinctly shorter and stouter antennal segments.

Contarinia trifolii Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 131-32; separate, p. 35
1908 ———— N. Y. State Mus. Bul. 124, p. 391

This small, yellowish form was taken at Albany, N. Y., June 1, 1906, on white clover, Trifolium repens.

Male. Length .75 mm. Antennae about twice the length of the body, thickly haired, light brown; 14 segments, fifth with stems one and one-fourth and twice their diameters respectively; terminal segment, basal enlargement prolonged, subconic, the distal enlargement subfusiform, with a spindle-shaped extremity. Palpi; the first segment slender, obpyriform, the second suboval, the third one-half longer, more slender, the fourth nearly twice the length of the third, much more slender. Face yellowish. Mesonotum yellowish brown. Scutellum, postscutellum and abdomen yellowish, the latter sparsely fuscous haired. Wings hyaline, costa light brown. Halteres yellowish transparent. Legs yellowish transparent, tarsi slightly darker; claws slender, uniformly curved. Genitalia; dorsal plate broad, deeply and triangularly emarginate, the lobes broadly rounded. Type Cecid. 108. (See plate 6, fig. 4)

Contarinia perfoliata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 391

This species was reared in August 1907 from florets of thoroughwort, Eupatorium perfoliatum, collected at Albany, N. Y.

Male. Length 1.1 mm. Antennae one-half longer than the body, thickly haired, yellowish; 14 segments, the fifth with stems twice and two and one-half times their diameters; terminal segment, basal enlargement subglobose, the distal enlargement fusiform, with a length over twice its diameter; apically a long, fingerlike process. Palpi; the first segment short, stout, subquadrate, the second one-half longer, narrowly oval, the third twice the length of the second, cylindric, the fourth as long as the third. Mesonotum reddish brown, the submedian lines yellowish. Scutellum and postscutellum fuscous yellowish. Abdomen light fuscous yellowish, the segments thickly margined posteriorly with fuscous hairs. Genitalia yellowish. Wings hyaline, costa light brown. Halteres pale yellowish, fuscous subapically. Coxae and femora yellowish transparent, the femora distally fuscous yellowish, tibiae yellowish basally, fuscous yellowish distally; tarsi fuscous yellowish; claws long, slender, strongly curved, the pulvilli nearly as long as the claws. Genitalia; dorsal plate short, broad, deeply and roundly emarginate, the lobes slender, narrowly rounded. Type Cecid. a1689a.

Contarinia flavolinea Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 392

The species was taken in general collecting at Albany, N. Y., June 11, 1906.

Male. Length 1 mm. Antennae as long as the body, thickly haired, dark brown; 14 segments, the fifth with stems two and four times their diameters, respectively; terminal segment, distal enlargement greatly produced, narrowly oval, with a length twice its diameter, apically a long, stout, fingerlike process. Palpi; the first segment produced, irregular, the second with a length nearly three times its diameter, tapering at both extremities, the third more slender and about twice the length of the second, the fourth more slender and one-half longer than the third; face pale yellowish. Mesonotum pale sooty yellow, with bright yellowish submedian lines thickly clothed with fine, yellowish hairs. Scutellum sooty yellowish with numerous apical setae; postscutellum a little darker. Abdomen sooty yellow, sparsely clothed with pale yellowish hairs. Wings rather broad, hyaline, costa light brown; halteres, coxae and femora pale straw; tibiae and tarsi a variable brown or dark brown; claws long, slender, strongly curved, the pulvilli about as long as the claws. Genitalia; dorsal plate short, broad, deeply and broadly emarginate, the lobes obliquely truncate. Type Cecid. 231.

Contarinia virginianiae Felt

1894 **Atkinson, G. F.** Cornell Univ. Agric. Exp. Sta. Bul. 73, p. 345–47 (Cecidomyia)
1897 **Lintner, J. A.** U. S. Dep't Agric., Div. Ent. Bul. 6, n. s., p. 57–58 (Cecidomyia)
1897 ——— Injur. & Other Ins. N. Y., 12th Rep't, p. 313 (Cecidomyia)
1904 **Cook, M. T.** Ohio State Univ. Bul., ser. 8, no. 3, p. 116 (Cecidomyia)
1906 **Felt, E. P.** Injur. & Other Ins. N. Y., 21st Rep't, p. 130–31 (Cecidomyia)
1907 **Jarvis, T. D.** Ent. Soc. Ont. 37th Rep't, p. 67
1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 392
1910 **Stebbins, F. A.** Springf. Mus. Nat. Hist. Bul., 2:40

The larva of this species produces peculiar, enlarged fruit on the choke cherry, Prunus virginiana. It has been known for some time though the fly was not reared till recently. The work of this insect is evidently widely distributed, since it has been observed by State Botanist Peck at Bethlehem, N. Y., and later seen by him in abundance at Keene Valley. The yellowish larvae occur near the center of the affected fruit, producing a bladderlike distension, further emphasized by the absence of the usual pit or stone. Prof. George F. Atkinson found that the affected fruit was also infested by a species of fungus, Exoascus cecidomophilus Atk.

Gall. Enlarged, bladderlike fruit without a pit or stone and inhabited by several yellowish larvae.

Male. Length 2 mm. Antennae longer than the body, thickly haired, yellowish brown; 14 segments, the fifth with stems one and one-half and two times their diameters; terminal segment, the distal enlargement suboval and with a short, broadly rounded process apically. Palpi; the first segment rectangular, the second more than twice the length of the preceding, the third a little longer and more slender than the second, the fourth more slender and about twice as long as the third. Face fuscous yellowish. Mesonotum reddish brown, the submedian lines fuscous yellowish. Scutellum pale yellowish, postscutellum reddish brown. Abdomen sparsely yellow haired, yellowish brown, the segments narrowly yellowish margined basally. Wings hyaline, costa yellowish brown. Halteres yellowish transparent. Legs a variable fuscous yellowish, the tarsi darker; claws long, stout, strongly and evenly curved, the pulvilli one-half longer than the claws. Genitalia; dorsal plate short, broad, slightly incised, the lobes broadly rounded. Described from alcoholic specimens.

Female. Length 2.5 mm. Antennae extending to the second abdominal segment, sparsely haired, light brown, yellowish basally; 14 segments, the fifth with a stem one-fourth the length of the cylindric basal enlargement; terminal segment slightly produced, obtuse. Palpi; the first segment short, stout, the second more than twice the length of the first, the third about as long as the second, more slender, the fourth one-half longer than the third, more slender. Mesonotum probably dark brown, the submedian lines broad, yellowish. Scutellum and postscutellum probably yellowish. The abdomen bright reddish brown (Fletcher). Wings hyaline, costa reddish brown. Coxae, femora and tibiae pale yellowish, tarsi light brown. Ovipositor fully one-half longer than the insect, the terminal lobes long, slender, broadly rounded. Type Cecid. 769.

Contarinia agrimoniae Felt

1907 **Felt, E. P.** New Species Cecid. II, p. 21
1908 ———— N. Y. State Mus. Bul. 124, p. 302, 392

The species was reared September 3, 1907 from yellowish larvae in florets of Agrimonia striata taken at Bath, N. Y., August 16, 1907.

Male. Length 1 mm. Antennae a little longer than the body, sparsely haired, pale straw; 14 segments, the fifth with stems one and two and one-half times their diameters, respectively; terminal segment, distal enlargement greatly produced, narrowly oval; apically a slender, fingerlike, narrowly rounded process. Palpi; the first segment rather slender, subrectangular, the second one-half longer, a little stouter, the third a little longer and more slender than the second, the fourth longer and more slender than the third; face pale yellowish. Mesonotum fuscous, the submedian lines indistinct. Scutellum and postscutellum fuscous. Abdomen a fuscous greenish white or yellowish. Wings hyaline, costa pale straw; halteres yellowish; coxae pale yellowish; femora, tibiae and tarsi mostly brown; claws long, slender, strongly curved, the pulvilli nearly as long as the claws.

Female. Length 1.25 mm. Antennae as long as the body, sparsely haired, fuscous yellowish; 14 segments, the fifth with a stem about one-fourth the length of the basal enlargement, which latter has a length about twice its diameter; terminal segment produced, tapering distally to a short, slender appendage. Palpi; the first segment rather long, slender, subrectangular, the second longer, stouter, tapering distally, the third one-half longer than the second, more slender, the fourth a little longer and more slender than the third; face yellowish. Mesonotum dark brown, the submedian lines thickly haired. Scutellum, postscutellum and abdomen fuscous yellowish, the segments margined posteriorly with fuscous hairs; membrane and pleurae yellowish. Ovipositor yellowish. Coxae light fuscous yellowish; femora a fuscous straw; tibiae fuscous straw, the posterior pair yellowish basally; tarsi fuscous straw; claws slender, the pulvilli as long as the claws. Ovipositor probably as long as the body, terminal lobes long, slender, tapering, narrowly rounded, otherwise nearly as in the male. Type Cecid. a1696.

Contarinia gossypii Felt

1908 **Felt, E. P.** Ent. News, 19:210–11
1908 ——— N. Y. State Mus. Bul. 124, p. 392
1908 **Ballou, H. A.** Agric. News (W. I.), 7:154
1909 ——— Agric. News (W. I.), 8:10; 58–59
1909 ——— West Ind. Bul., 10:1–28
1909 **Felt, E. P.** Ent. Soc. Ont. 39th Rep't, p. 43

This species appears to be quite destructive to cotton buds throughout the Island of Antigua, British West Indies. Specimens were received from Prof. Henry A. Ballou, entomologist of the Imperial Department of Agriculture, Barbadoes, through Dr L. O. Howard of the United States Bureau of Entomology. The first indication of infestation, according to Professor Ballou, is the excessive dropping of buds, produced by the numerous yellowish maggots occurring therein, as many as 43 having been found in one bud.

The eggs are undoubtedly laid in the developing flowers, the maggots forsaking the buds before they drop. The infestation is evidently very similar to the injury to grape buds by Contarinia johnsoni Sling. This cotton pest may be recognized by the greenish yellow abdomen, the dark-brown mesonotum and by the fifth antennal segment having the basal portion of the stem with a length two and one-half times its diameter, the distal part with a length four times its diameter; the fourth palpal segment is one-fourth longer than the third. A parasite, Zatropus deuterus Craw., has been reared from this midge.

Contarinia rumicis Loew

1850 **Loew, H.** Dipt. Beitrage, 4:34, no. 18
1908 **Felt, E. P.** Econ. Ent. Jour., 1:19
1908 ———— N. Y. State Mus. Bul. 124, p. 392

Numerous reddish or brown seeds of curled dock, Rumex crispus, were taken by D. B. Young at Newport, N. Y., July 18, 1907 and the above-named European species reared. Our provisional identification was kindly confirmed by L'Abbe J. J. Kieffer, a noted European authority in this group.

Gall. Seeds infested by this species are reddish or brown, each containing a single larvae. Professor Trail[1] states that this species occurs in the swollen buds of sheep sorrel, Rumex acetosella, from which adults may be easily reared.

Contarinia divaricata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 392

This midge was taken at Albany, N. Y., June 21, 1906 on hard pine, Pinus rigida.

Male. Length 1 mm. Antennae a little longer than the body, thickly fine-haired, dark brown; 14 segments, the fifth with stems one and one-half and two and one-half times their diameters, respectively. Palpi; the first segment short, obconic, second one-half longer, third a little longer and the fourth fully one-half longer than the third; basal antennal segment and face fuscous yellowish. Mesonotum dark brown, submedian lines sparsely haired. Scutellum dark brown with sparse apical setae, postscutellum dark brown. Abdomen a fuscous yellow. Genitalia darker, sparsely dark haired. Wings hyaline, costa dark brown; halteres a fuscous transparent. Legs straw yellow, lighter ventrally; tarsi slightly darker; claws rather strongly curved. Genitalia; dorsal plate broad, slightly emarginate, the lobes obliquely truncate. Type Cecid. 350. (See plate 6, fig. 3)

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[1] Trail, J. W. H. The Gall Making Diptera of Scotland. 1888. Scottish Naturalist, separate, p. 27.

Contarinia sambucifolia Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 131; separate, p. 35
1908 ——— N. Y. State Mus. Bul. 124, p. 392

The species was taken on elder, Sambucus canadensis, at Lake Clear, N. Y., June 7, 1906.

Male. Length 1 mm. Antennae about twice the length of the body, thickly haired, dark brown, yellowish basally; 14 segments, the fifth with stems two and two and one-half times their diameters, respectively. Palpi; the first segment short, narrowly oval, the second longer, broadly oval, the third twice the length of the preceding, more slender, the fourth about twice the length of the third, more slender; face pale yellowish. Mesonotum dark brown, lighter posteriorly, submedian lines yellowish. Scutellum yellowish apically, postscutellum and abdomen pale salmon. Wings hyaline, costa light brown; halteres yellowish transparent. Legs nearly uniform pale straw, irregularly tinged with carmine at the articulations; tarsi brownish dorsally; claws slender, uniformly curved. Genitalia; dorsal plate broad, short, deeply and triangularly incised, the lobes with the internal two-thirds obliquely truncate, the external portion broadly rounded. Type Cecid. 153.

Contarinia viridiflava Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 392

This species was taken on thistle at Albany, N. Y., July 17, 1906.

Male. Length 1.25 mm. Antennae one-half longer than the body, thickly haired; 14 segments, the fifth with stems two and one-half and three times their diameters, respectively. Palpi; the first segment rather long, stout, expanded distally, the second about as long as the first, narrowly oval, the third one-half longer than the second, more slender, the fourth a little longer than the third, more slender. Mesonotum fuscous, with yellowish submedian lines. Abdomen greenish yellow. Wings hyaline, costa pale straw; halteres and legs probably pale straw; claws long, slender, strongly curved, the pulvilli a little longer than the claws. Genitalia; dorsal plate short, broad, deeply and narrowly emarginate, the lobes irregularly rounded. Type Cecid. 606.

Contarinia spiraeina Felt

1911 **Felt, E. P.** Econ. Ent. Jour., 4:547-48

The yellowish red midges were reared April 6, 1911 from bud galls on Spiraea collected by Miss Cora H. Clarke at Magnolia, Mass., June 2, 1910. Miss Clarke characterized these galls as cabbage galls or lettuce galls and so far as we could determine they did not differ materially in appearance from a moderately large bud gall on this plant such as that made by Clinodiplosis clarkei Felt. The adult is described elsewhere, see the above citation.

Gall. Length 7 mm, diameter 3 mm. This deformity appeared to be an ordinary bud gall and did not present any specially characteristic features.

Contarinia truncata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 393

The midges were taken at Albany, N. Y., being driven from shelter by stirring up dead leaves May 25, 1907.

Male. Length .75 mm. Antennae fully one-half longer than the body, thickly haired, light fuscous yellowish; 14 segments, the fifth with stems one and one and one-half times their diameters, respectively; terminal segment, basal portion of the stem with a length one-half its diameter, the distal enlargement greatly produced, broadly fusiform and apically a short, stout appendage. Palpi; the first segment short, stout, expanded distally, the second short, broadly oval, the third one-half longer and more slender than the second, the fourth one-half longer and more slender than the third; face fuscous yellowish. Mesonotum dark brown, submedian lines rather thickly clothed with fine hairs. Scutellum dark fuscous yellowish, postscutellum a little darker. Abdomen light brown, third and fourth segments tinged with dark brown. Wings hyaline, costa light brown; halteres yellowish transparent; legs a variable fuscous yellow, extremities of the femora slightly fuscous, the tarsi variably tinged with carmine at the articulations; claws long, slender, evenly curved, the pulvilli a little shorter than the claws. Genitalia; dorsal plate short, stout, deeply and narrowly emarginate, the lobes roundly truncate. Type Cecid. 1202.

Contarinia clematidis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 393

This species was reared August 12, 1907 from an irregular, subglobular gall taken on Virgins bower, Clematis virginiana, at Newport, N. Y., July 24, 1907.

Gall. It is an irregular, subglobular mass about 1 cm in diameter, composed of the deformed or enlarged bases of rudimentary leaves. The gall is green, slightly hoary, and usually occurs in the axil of a leaf.

Male. Length 1.5 mm. Antennae as long as the body, thickly haired, light brown, basally straw colored; 14 segments, the fifth with stems one and three times their diameters respectively; terminal segment, basal portion of the stem with a length one-half greater than its diameter, the distal enlargement subcylindric, with a length about three times its diameter and apically a long, fusiform appendage. Palpi; the first segment short, stout, irregular, the second narrowly oval, with a length about twice its diameter, the third one-half longer, more slender, the fourth about as long as the third; face straw color. Mesonotum a dirty brown; the submedian lines hardly apparent. Scutellum and postscutellum concolorous with the mesonotum. Abdomen grayish brown. Wings hyaline, costa dark brown; halteres dark basally, lighter apically. Coxae fuscous, the base of femora fuscous, the distal portion of femora, the anterior and mid tibiae and base of the hind tibiae are brown, the tip of the latter fuscous, the anterior and mid tarsi black, first segment of hind tarsi yellowish orange tipped with black, the base of the second segment yellowish orange, the remainder of the third segment and the fourth and fifth fuscous; claws long, stout, strongly curved, the pulvilli about as long as the claws. Genitalia; dorsal plate short, broad, deeply and roundly emarginate, the lobes irregularly rounded. Type Cecid. a1659b.

Contarinia viatica Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 393

This species was taken at Albany, N. Y., on clover, Trifolium repens, June 9, 1906.

Male. Length 1 mm. Antennae as long as the body, sparsely haired, light brown; 14 segments, the fifth with stems one and one-fourth and two times their diameters respectively; terminal segment, basal enlargement subglobular, a very short stem separating it from the distal enlargement, which latter is ovoid. Palpi; the first segment much reduced, the second subquadrate, the third a little more prolonged, ovate, the fourth one-fourth longer than the second, fusiform; face dark. Mesonotum dark brown with fine lines of pale hairs. Scutellum and postscutellum dark brown. Abdomen reddish brown, genitalia darker. Wings hyaline, costa dark brown; halteres yellowish transparent at the base, reddish fuscous apically. Coxae dark brown, femora and tibiae yellowish brown, tarsi a little darker and with a reddish shade; claws rather slender, evenly curved, those of the middle leg with a rather conspicuous rounded process basally. Genitalia; dorsal plate broad, broadly and triangularly emarginate, the lobes broadly rounded. Type Cecid. 105a. (See plate 6, fig. 2)

Contarinia sorghicola Coq.

1898 **Coquillett, D. W.** U. S. Dept. Agric., Div. Ent. Bul. 18, n. s. p. 81–82 (Diplosis)

1908 **Ball, C. R.** Science, 27:114–15 (Diplosis)

1908 ———— Bur. Plant. Indust. Cir. 13

1908 **Piper** (? C. V.). Ent. Soc. Wash. Proc., 10:109 (Diplosis)

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 393
1909 ——— Ent. Soc. Ont. 39th Rep't, p. 43
1909 **Herrick, G. W.** Ent. News, 20:116–18
1909 **Trehern, R. C.** Ent. Soc. Ont. 39th Rep't, p. 47–49
1910 **Dean, W. H.** Econ. Ent. Jour., 3:205–7
1910 ——— U. S. Dept. Agric., Bur. Ent. Bul. 85, pt 4, p. 39–58
1913 **Newell, Wilmon & Barber, T. C.** U. S. Dept. Agric., Bur. Ent. Bul. 122, p. 69–71 (Iridomyrmex humilis preying on)

This species was first observed in the south in October 1895, specimens of infested heads of Sorghum vulgare from Dillburg and Montgomery, Ala., being then received at the Bureau of Entomology. This insect appears to be widely distributed in the south at the present time, having been recorded from North Carolina, South Carolina, Georgia, Louisiana, Texas, Arkansas, Indian Territory, Missouri and Kansas. This midge prevents, in the majority of cases, the maturing of a profitable seed crop in the estimation of W. H. Dean, who has made a special investigation of the pest. The adult may be recognized by its orange-red abdomen, in connection with the fifth antennal segment having the basal portion of the stem with a length one-half greater than its diameter and the broadly and triangularly emarginate dorsal plate.

This insect, it has been found, subsists, in addition to the many varieties of sweet sorghum, upon broom corn, kafir corn, Johnson grass and Milo miaze. Mr Dean reared one adult from fox-tail grass, Setaria glauca, and Mr Ainslie obtained it from another grass, Sieglingia seslerioides.

Life history. The midges appear in early spring, breeding at first in Johnson grass, and by the time sorghum has headed, the midge has become sufficiently abundant to produce a serious infestation. The eggs are deposited by the parent midge within the floret and usually near the apex of the ovary. Infested heads of sorghum have a characteristic flattened appearance, the ovary being blackened and shriveled. The life of the midge in confinement is stated to be approximately 24 hours, though females, if allowed to oviposit, may live about 48 hours. From a dozen to upwards of 100 eggs were found upon dissection. Breeding may continue throughout the season as long as there are any heads in which to oviposit. The insect hibernates as a larva within a delicate, muddy brown envelop somewhat like the " flax seed " of the Hessian fly. The activities of this insect, like the Hessian fly, Mayetiola destructor Say, are evidently closely correlated with the condition of vegetation, breeding continuing so long as a suitable food supply exists. The life cycle may be completed in from 14 to 20 days.

This midge is abundantly parasitized in certain localities by Aprostocetus diplosidis and Tetrastichus, the latter being both a primary and secondary parasite. By far the most important predaceous enemy of the midge is the Argentine ant, Iridomyrmex humilis Mayr. These insects swarm over the sorghum plants and seize and carry off the midge pupae projecting from sorghum seeds. A fly, Psilopodinus flaviceps Aldr., has been observed preying upon the midges. It is probable that humming birds also devour these small flies.

Remedial measures. Johnson grass should not be allowed to grow in the vicinity of sorghum fields, since it is an important factor in producing an early infestation. Clean harvesting, resulting in the caring for and adequate destruction of infested heads, will do much to reduce the number of midges appearing the following season. The destruction of the early crop of seed has been suggested as a means of eliminating a large percentage of the midges and thus securing a nearly full, clean, late crop.

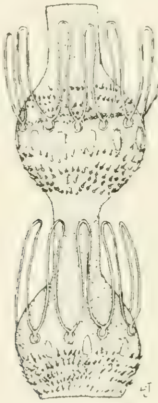

Fig. 31 Contarinia sorghicola, fifth antennal segment of male (enlarged, original)

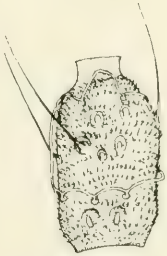

Fig. 32 Contarinia sorghicola, fifth antennal segment of female (enlarged, original)

Description. *Egg.* Length .15 mm, pale pink or yellow, delicate, elongate, cylindric.

Larva. The full-grown larva is broadly oval, deep red and with a distinct breastbone.

Pupa. The newly formed pupa is of a uniform deep red color, the head and appendages turning black before the appearance of the fly. This pupa is inclosed in a delicate, muddy brown envelop resembling the " flax seed " of the Hessian fly.

Male. Length 2 mm. Antennae about as long as the body, rather thickly haired, light brown; 14 segments, the fifth with stems one and one-half and as long as their diameters respectively; terminal segment, basal enlargement subglobose, the basal portion of the stem short, the distal enlargement broadly oval, with a very short, stout process apically. Palpi; the first segment stout, subrectangular, with a length nearly twice its diameter, the second a little longer, more slender than the first, the third more than twice the length of the second, much more slender. Face yellow; thorax orange red, the center of the mesonotum and the spot crossing the plurae and enlarging on the sternum, black; abdomen orange red; wings hyaline; costa light brown. Legs light brown; claws long, slender, strongly curved, the pulvilli a little shorter than the claws. Genitalia; dorsal plate short, broad, broadly and triangularly emarginate, the lobes broadly rounded.

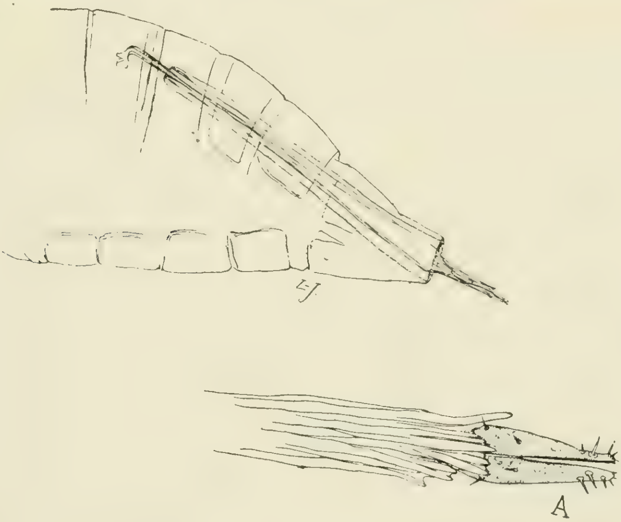

Fig. 33 Contarinia sorghicola, side view of abdomen showing the retracted ovipositor (enlarged), A tip (more enlarged, both original)

Female. Length 2 mm. Antennae extending to the third abdominal segment, sparsely haired, light brown; 14 segments, the fifth very short, stout, subcylindric, the basal enlargement with a length about two and one-half times its diameter; terminal segment produced, slightly constricted at the basal third, enlarged at the distal third and tapering strongly, narrowly rounded. Palpi; the first segment long, slender, somewhat expanded distally, the second a little longer and stouter than the first, the third as long as the second, more slender. Face yellowish; thorax orange red, the center of the mesonotum and the spot crossing the plurae and enlarging on the sternum, black; abdomen orange red. Wings and legs as in the opposite sex. Ovipositor longer than the body, bearing a pair of long, slender lobes, the latter with a length fully five times their width. Type Cecid. 972.

Contarinia obesa n. sp.

This remarkable midge was taken May 8, 1909 in a pine woods near Albany. It is easily distinguished by the stout, obese terminal clasp segment without an appreciable apical spur.

Male. Length 2 mm. Antennae a little longer than the body, thickly haired, fuscous yellowish; 14 segments, the fifth with stems one and one-half and three and one-half times their diameters respectively; terminal segment with the distal enlargement broadly elliptical. Palpi; first segment with a length three times its diameter, slightly incrassate, the second and third longer than the first, subequal, the fourth one-fourth longer than the third, slender. Mesonotum shining dark brown, the submedian lines sparsely haired. Scutellum fuscous yellowish, postscutellum a little darker. Abdomen thickly haired, reddish brown; genitalia fuscous. Wings hyaline, costa fuscous yellowish, the third vein well beyond the apex. Halteres pale orange basally, fuscous apically. Coxae dark reddish. Legs mostly fuscous yellowish; claws long, evenly curved, slender, the pulvilli longer than the claws. Genitalia; basal clasp segment long, stout, truncate; terminal clasp segment short, greatly swollen, broadly rounded; dorsal plate short, broad, slightly and triangularly incised, the lobes broadly rounded. Type Cecid. 1349.

Contarinia ampelophila Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 132; separate, p. 35-36
1908 ——— N. Y. State Mus. Bul. 124, p. 393

The species was taken on grape, Vitis species, at Albany, N. Y., April 26, 1906.

Male. Length .75 mm. Antennae nearly twice the length of the body, thickly haired, pale brown; 14 segments, the fifth with stems one and one-half and three and one-half times their diameters. Palpi; the first segment subquadrate, the second broadly rounded, one-half longer, the third slender, a little longer than the second and the fourth one-half longer than the third. Face and mesonotum dark brown. Scutellum reddish brown, postscutellum darker.

Abdomen brownish red. Wings hyaline, the larger veins tinged with red. Halteres yellowish transparent. Legs straw yellow, tarsi a little darker apically; claws slender, strongly curved. Genitalia; dorsal plate slender, deeply emarginate, the lobes broadly rounded. Type Cecid. 9. (See plate 9, fig. 5)

Contarinia balsamifera Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 131; separate, p. 34–35
1908 ———— N. Y. State Mus. Bul. 124, p. 393

This small, yellowish red species was exceedingly common in the balsam trees about Lake Clear, June 7, 1906. Swarms were observed one still afternoon flying about balsam, Abies balsamifera, and it was also taken about hemlock or hemlock spruce, Abies canadensis. This may be identical with the Diplosis balsamifera Lintn., though none of the characteristic galls were discoverable.

Male. Length 1 mm. Antennae about twice as long as the body, thickly haired, light brown; 14 segments, the fifth with stems each two and one-half times their diameter; terminal segment, basal enlargement subglobular, the distal enlargement fusiform, the apex slightly produced, narrowly rounded. Palpi; the first segment short, subquadrate, the second subrectangular, twice the length of the preceding, the third more slender, a little longer, the fourth a little longer and more slender than the preceding; face yellowish brown. Mesonotum dark brown, the posterior median area lighter, submedian lines yellowish. Scutellum yellowish carmine, postscutellum and abdomen light yellowish red. Wings hyaline, costa light brown; halteres whitish transparent. Legs nearly uniform light brown, lighter ventrally, tarsi darker; claws slender, strongly and uniformly curved. Genitalia; dorsal plate broad, deeply and triangularly incised, the lobes narrowly rounded. Type Cecid. 143.

Contarinia pyrivora Riley

Pear Midge

1884 **Ormerod, E. A.** Obsv. Inj. Ins. 7th Rep't, p. 52–54 (Cecidomyia nigra)
1884 **Smith, J. B.** U. S. Com. Agric. Rep't, p. 396–98 (Cecidomyia)
1885 **Riley, C. V.** U. S. Com. Agric. Rep't, p. 283–89 (Diplosis)
1887 ———— Wien. Ent. Zeit., 6:201–6 (Diplosis nigra)
1888 ———— **& Howard, L. O.** Ins. Life, 1:120–21 (Diplosis)
1888 **Meade, R. H.** Entomologist, 21:123–31 (Diplosis)
1888 **Bloomfield, E. N.** Ent. Monthly Mag., 24:273–74 (Cecidomyia nigra Meig.)
1889 ———— Ent. Month. Mag., 25:323–24 (Cecidomyia)
1891 **Lintner J. A.** Can. Ent., 23:223–24 (Diplosis)
1891 **Riley, C. V. & Howard, L. O.** Ins. Life, 4:125 (Platygaster philanna Walk., reared, D. nigra Meig.)

1891 **Smith, J. B.** N. J. Agric. Exp. Sta. 12th Rep't, p. 397–402 (Diplosis)
1891 ——— Ins. Life, 4:45 (Diplosis)
1891 **Riley, C. V. & Howard, L. O.** Ins. Life, 4:161 (Diplosis)
1891 **Coe, A. J.** Count. Gent., 56:896
1891 **Lintner, J. A.** Garden & Forest, 4:276 (Diplosis)
1891 **Ritzema Bos. J.** Tiersche Schädlinge und Nützlinge, p. 587 (C. nigra Meig.)
1892 **Smith, J. B.** Ins. Life, 5:94
1892 **Lintner, J. A.** Science, 19:343–44 (Diplosis)
1892 **Theobald, F. V.** British Flies, p. 64 (C. nigra Meig.)
1893 **Lintner, J. A.** Injur. & Other Ins. N. Y., 8th Rep't, p. 140–51 (Diplosis)
1893 **Smith, J. B.** Ent. News, 4:297–99
1894 ——— N. J. Agric. Exp. Sta. Bul. 99, p. 1–14 (Diplosis)
1895 **Lintner, J. A.** Count. Gent., 50:456, 472 (Diplosis)
1895 ——— Injur. & Other Ins. N. Y., 10th Rep't, p. 386–87 (Diplosis)
1896 ——— 11th Rep't N. Y. State Ent., p. 166–69
1897 **DelGuercio, G.** Soc. Ent. Ital. Bul. 29, p. 17–23 (Cecidomyia)
1897 **Felt, E. P.** Psyche 8, p. 3, 4, 5
1901 **Howard, L. O.** Ins. Book, p. 114
1902 **Banks, Nathan.** U. S. Dept. Agric., Div. Ent. Bul. 34, n. s. p. 46
1902 **Smith, J. B.** N. J. Agric. Exp. Sta. Bul. 155, p. 32
1907 **Theobald, F. V.** Rep't of Econ. Zool., p. 65–67 (Diplosis)
1907 **Marchal, Paul.** Ent. Soc. Fr. Ann., v. 76; separate, p. 1–27
1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 393
1909 ——— Ent. Soc. Ont., 39th Rep't, p. 43

This insect is, without much doubt, a European form which seem to have become established in this country about 1877. Its firs appearance was on the fruit farm of Coe Brothers at Meriden, Conn., whither it was probably brought with some pear stock imported from France in the above-mentioned year. It was at first not very destructive, but in 1884 a large quantity of fruit ruined by the maggots attracted attention and it was at this time brought to the notice of entomologists. Subsequently it spread and now is well established in New Jersey, in the Hudson valley, and presumably in other fruit sections of the country.

Injuries. This insect is more easily detected by the characteristic deformations of the fruit than in any other way. The small yellowish larvae occur within the young pears about the latter part of May and early in June. The infested fruit becomes irregularly distorted and about the time the larvae become full grown, namely June 1st, rains induce a rapid decay and cause it to crack open.

Life history. The midges appear a little before the pears are in blossom, and display a marked preference for Lawrence pears. The egg laying of presumably the same species, known to Europeans as Cecidomyia nigra Meig., has been observed and described by Schmidberger. A translation of his account has been given by Doctor Smith as follows:

> When the blossom buds of the pear tree were so far developed that in the single blossoms a petal showed itself between the segments of the calyx, I found the first gall midge in the act of laying its eggs in the blossom; this was on the 12th of April. It had fixed itself almost perpendicularly in the middle of a single blossom, and having pierced the petal through with its long ovipositor, it laid its eggs on the anthers of the still closed blossom. The female was about seven and a half minutes in laying her eggs. When she had flown away, I cut the pierced bud in two, and found the eggs lying in a heap one upon another on the anthers. They were white, longish, one side pointed and transparent, and 10 to 12 in number. I afterwards found several midges engaged in laying their eggs as late as the 18th of April, from which day they ceased to appear in the garden. I also saw a gall midge on the side of a blossom with its ovipositor inserted in it, so that they do not merely pierce the petals but the calyx also. I even saw one, which having been somewhat long in laying its eggs, could not draw out the ovipositor from the blossom; the cause of which I conceived to be that the wound had begun to close during the operation and the ovipositor was thereby held.

Schmidberger, according to Doctor Smith, states that the eggs hatch quickly in warm weather, since on the fourth day after their deposition he had found small larvae on the young fruit. They enter near the calyx and before the blossom is expanded they descend to the core so as not to be exposed to the rays of the sun. They separate at this point and begin to devour the pear on all sides. The entrance to the ovary or core of the young pear is wide open and there is, therefore, no eating or piercing required on the part of the midge larva. The young maggots develop rapidly as the fruit sets. They are at first whitish, later changing to yellow or orange with maturity, which usually occurs early in June. Rains coming at this time cause the fruit to decay rapidly and crack, giving the maggots an opportunity to drop to the soil which they penetrate from one-half of an inch to 2 inches and lie for some time unchanged. About midsummer oval silken cocoons, covered with grains of sand, are exuded and the maggots remain therein unchanged until early spring, the flies appearing about the time the trees bloom.

Description. The larva and pupa have been described by Doctor Riley:

"*Larva.* Length, 4 mm to 4.5 mm. Color pale yellow. Surface polished and very faintly reticulated. Breastbone pale brownish, its apex broadly bilobed. Body (13 joints and subjoint) fourteen jointed, exclusive of the head. Antennae two jointed. Anal subjoint much narrower laterally than the penultimate, slightly concave, the concavity beset with 6 (3 each side) small, fleshy tubercles, of which the second one on each side is stoutest, those on the external angles bearing each a short spine. Spiracles normally placed and mounted on tubercles.

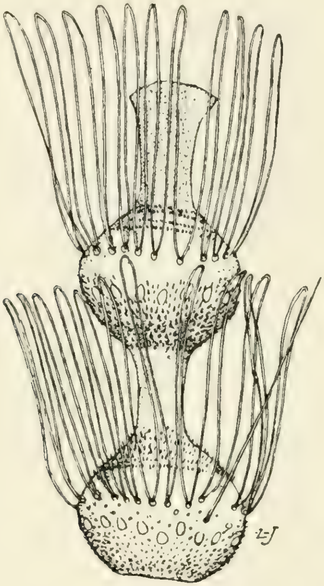

Fig. 34 Contarinia pyrivora, fifth antennal segment of male (enlarged, original)

Pupa. Average length about 3 mm. Head, thorax, legs and wing cases blackish, abdomen yellow. Head and thorax together about as long as the two basal joints of the abdomen. Front of head conical, acute, having each side, close to the eye, a stout spine and two fine hairs dorsally. Another stout, somewhat curved spine arises from the upper angle of the wing cases which reach to the third abdominal joint. Abdomen quite strongly curved, the sutures rather deep, and containing dorsally a somewhat semicircular, scalelike piece, covered with minute retrorse spines; tip unarmed and bluntly rounded. Exuvium without special significance, the antennal sheaths remaining very much in the normal position."

Male. Length 1.5 mm. Antennae one-half longer than the body, thickly haired, pale yellowish; 14 segments, the fifth with stems each two and one-half times their diameters, circumfili characteristic; terminal segment, basal portion of the stem reduced, the distal enlargement prolonged, broadly fusiform and with a long, slender, tapering appendage. Palpi; the first segment short, stout, slightly dilated subapically, the second one-half longer, broad, narrowly oval, the third a little longer and more slender than the second, the fourth about as long and more slender than the third. Mesonotum dark brown, the submedian lines indistinct. Scutellum reddish brown, postscutellum probably darker. Abdomen sparsely haired, light brown. Wings hyaline, costa light brown. Halteres yellowish transparent. Legs a nearly uniform yellowish transparent; claws rather long, stout, strongly curved, the pulvilli nearly as long as the claws. Genitalia; dorsal plate short, broad, deeply and narrowly incised, the lobes broad, broadly rounded.

Female. Length 3 mm. Antennae extending to the third abdominal segment, dark brown, sparsely haired, fourteen segments; the fifth with a stem about one-fourth the length of the subcylindric basal enlargement. Palpi; the first segment short, irregularly subquadrate, the second about as long, more slender, slightly expanded distally, the third one-half longer, stouter, narrowly oval, the fourth one-fourth longer than the third, more slender. Mesonotum, scutellum and postscutellum black, the abdomen dark brown; incisures and pleurae yellowish red. Wings hyaline, costa dark brown. Halteres semitransparent basally, reddish apically; legs a variable fuscous yellowish brown. Ovipositor long, narrow, narrowly rounded. Otherwise nearly as in the male. (See plate 6, fig. 1)

Described from alcoholic specimens.

Cecid. 959.

Remedial measures. The most effectual method of keeping this pest in subjection, where its ravages are serious, is by the early destruction of the infested fruit, that is, the removal and burning or deep burial of all such fruit by the latter part of May, before the pears have advanced so far as to decay and crack during rains. This method might be made a little more effective by setting a few Lawrence trees for the sole purpose of attracting the midges to the young fruit, thus drawing them away from more desirable var eties.

Contarinia maculosa Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 394

This olive-brown species was taken July 17, 1906 on bittersweet, Celastrus scandens, at Albany, N. Y.

Male. Length 1.6 mm. Antennae one-fourth longer than the body, thickly haired, light brown, basally fuscous yellowish; 14 segments, the fifth with stems one and one-half and three times their diameters, respectively; terminal segment, basal enlargement subglobose, the basal portion of the stem with a length twice its diameter, the distal enlargement narrowly oval, with a length twice its diameter, apically a long, slender, fingerlike process. Palpi; the first segment short, stout, irregular, the second long, stout, with a length about twice its diameter, the third one-third longer than the second, more slender, the fourth a little longer than the third, somewhat dilated; face fuscous yellowish. Mesonotum dark brown, the submedian lines thickly haired. Scutellum and postscutellum dark brown. Abdomen a light olive brown, rather thickly clothed with fuscous hairs. Wings subhyaline, spotted with fuscous, with fuscous markings at the basal third on costa and at the posterior margin and near the middle of the third vein and at the fork of the fifth vein and a less distinct fuscous spot at the apical third on the third vein; costa pale straw; halteres yellowish transparent. Legs a light yellowish brown, except the posterior tibiae and tarsi which are light yellowish with a long, fuscous annulation on the tibiae distally, the three distal tarsal segments slightly fuscous; claws long, slender, strongly curved, the pulvilli a little shorter than the claws. Genitalia; dorsal plate long, broad, deeply and triangularly emarginate, the lobes narrowly rounded. Type Cecid. 599.

Contarinia negundifolia Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 394
1909 ——— Ent. Soc. Ont. 39th Rep't, p. 43

The species, received through the courtesy of the United States National Museum, was reared April 21, 1885 from leaves of box elder, Negundo aceroides, collected by Theodore Pergande May 12, 1884 in Virginia. Mr Pergande states that the larvae deserted the gall May 15th and entered the ground, remaining there until the following spring. Apparently the same form was received June 20, 1908 from the late Dr James Fletcher, Ottawa, Can., and again July 8, 1916 from Winnipeg, Manitoba, through J. M. Swaine, assistant entomologist of the entomological branch of the Canadian Department of Agriculture. It may possibly be identical with Cecidomyia negundinis Gill.

Gall. Irregular, globose, pocket-shaped, separate or confluent, midrib or vein swellings, usually with a slight enlargement on the lower surface and a marked elevation on the upper surface. The color may vary from a light bluish green to a yellowish or even deep red; diameter 2 to 4 mm, the opening on the under surface. Badly infested leaves may be crumpled and yellowish.

Larva. Moderately stout, whitish, distinctly segmented, the extremities rounded; length 2 mm; head small, broadly rounded anteriorly, the antennae moderately long, biarticulate, the terminal segment narrowly rounded apically; breastbone bidentate, narrowly triangular, the anterior margin expanded and the shaft tapering from the base of this to a subacute apex posteriorly; skin rather coarsely shagreened, posterior extremity broadly rounded and with a dorsal pair of submedian short, broadly triangular, chitinous processes.

Male. Length 1.5 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems one and three times their diameters, respectively; terminal segment, basal enlargement subhemispheric, the distal one subfusiform, and with a stout, narrowly rounded process distally. Palpi; the first segment short, stout, subquadrate, the second a little longer and somewhat expanded distally, the third one-half longer than the second, stout, tapering apically, the fourth one-half longer and more slender than the third. Mesonotum dark brown, the submedian lines sparsely haired. Scutellum reddish brown, postscutellum and abdomen dark brown, the latter sparsely haired. Wings hyaline, costa reddish brown; halteres yellowish basally, fuscous apically. Legs fuscous yellowish; claws long, stout, strongly curved distally, the pulvilli as long as the claws. Genitalia; dorsal plate short, broad, slightly and roundly incised, the lobes irregularly rounded.

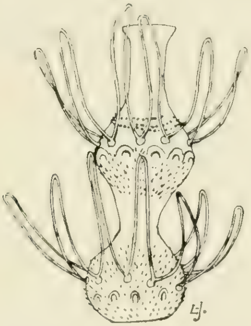

Fig. 35 Contarinia negundifolia fifth antennal segment of male (enlarged, original)

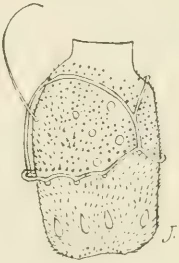

Fig. 36 Contarinia negundifolia, fifth antennal segment of female (enlarged, original)

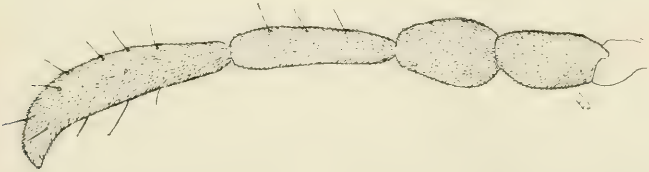

Fig. 37 Contarinia negundifolia, palpus of female (enlarged, original)

Female. Length 1.75 mm. Antennae extending to the second abdominal segment, sparsely haired, dark brown, yellowish basally; 14 segments, the fifth with a stem one-fourth the length of the subcylindric basal enlargement, which latter has a length three times its diameter and is slightly constricted near the middle; terminal segment somewhat reduced, broadly rounded apically. Palpi; the first segment short, incrassate, the second broadly rectangular, the third with a length five times its diameter, the fourth one-half longer than the third, expanded distally. Mesonotum dull brown, the submedian lines thickly haired. Scutellum and postscutellum yellowish orange. Abdomen mostly deep orange, the irregular and variable dorsal and ventral sclerites dark brown. Ovipositor pale orange. Wings hyaline, costa light brown. Coxae fuscous yellowish, femora and tibiae mostly pale yellowish, slightly fuscous apically; tarsi a variable fuscous yellowish. Ovipositor two-thirds the length of the abdomen; terminal lobe with a length four times its diameter, tapering, subacute.

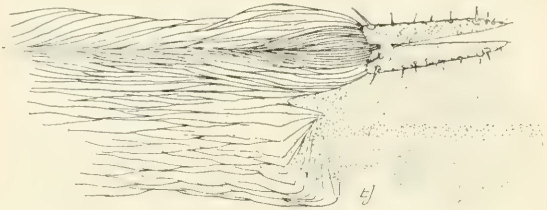

Fig. 38 Contarinia negundifolia, ovipositor of female, the stippled area is probably an artifact (enlarged, original)

Exuviae. Length 1.5 mm, whitish, the antennal cases extending to the first abdominal segment, cephalic horns rather stout, strongly curved, the wing cases extending to the fourth abdominal segment and the leg cases to the fifth abdominal segment, the dorsum of the abdominal segments thickly studded with chitinous points and anteriorly becoming obsolete, laterally with an irregular, double or treble row of chitinous, bidentate or unidentate processes. Type Cecid. 967.

Contarinia setigera Lintn.

1896 **Lintner, J. A.** N. Y. State Ent. Rep't 11, p. 168–70 (Diplosis)
1897 **Felt, E. P.** Psyche, 8:4, 5, pl. 1, figs. 1 and 2 (Diplosis)
1908 ——— N. Y. State Mus. Bul. 124, p. 394

This species was reared by the late Doctor Lintner from melon tips received from Lowell, Mass., and also containing larvae of Aphidoletes cucumeris Lintn., the form under discussion presumably being responsible for the gall.

Contarinia canadensis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 394

The midges, received through the courtesy of the United States National Museum, bear the label, Toronto, Ontario, April 18, 1897. The insects were pinned in a lot bearing similar locality and date labels and one, though belonging to another group, was labeled in addition Cecidomyia pellex. The general appearance of these insects is so similar that they were doubtless considered as belonging to one species and were presumably reared from the familiar gall on ash, generally ascribed to Cecidomyia pellex.

Gall. The gall from which this insect was reared, if our association be correct, is a large, tumid, green, reddish or brownish midrib swelling ranging in length from 5 to 15 cm. The larger galls contain from 30 to even 50 or more larvae which are found irregularly scattered along the length of the deep fold evidently caused by their activities.

Male. Length 1.25 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems one and one-half and three times their diameters, respectively; terminal segment, basal enlargement subglobose, the basal portion of the stem with a length over twice its diameter, the distal enlargement much produced, fusiform. Palpi; the first segment short, stout, expanded distally, the second stout, subquadrate, with a length about twice its diameter, the third one-fourth longer, more slender than the second, the fourth more than twice the length of the third, more slender. Mesonotum dark brown, the submedian lines thickly haired. Scutellum pale yellowish brown, postscutellum a little darker. Abdomen dark brown, rather thickly haired. Wings hyaline, costa pale straw; halteres pale yellowish. Legs a variable yellowish brown, the femora distally and the tarsal segments somewhat darker; claws long, slender, strongly curved, the pulvilli a little longer than the claws. Genitalia; dorsal plate short, stout, deeply and triangularly incised, the lobes broadly rounded.

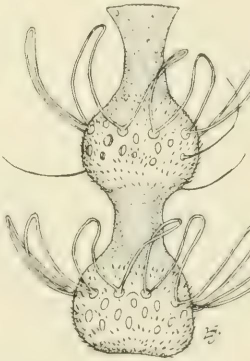

Fig. 39 Contarinia canadensis, fifth antennal segment of male (enlarged, original)

Female. Length 3 mm. Antennae extending to the third abdominal segment, sparsely haired, light brown; 14 segments, the fifth with a stem about one-fifth the length of the subcylindric basal enlargement, which latter has a length about twice its diameter; terminal segment reduced, the enlargement with a length about twice its diameter, apically a short, stout appendage. Palpi; the first segment short, stout, slightly expanded at the distal fourth, the second stout, rectangular, with a length about twice its diameter, the third a little longer, more slender, the fourth one-half longer and more slender than the third. Color, wing and leg characters about as in the opposite sex. Ovipositor about as long as the abdomen, the terminal lobes indistinct. Type Cecid. 1027.

Contarinia coloradensis Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour. 20:240-41

This species produces a large, budlike deformity on Pinus scopulorum, although Dicrodiplosis gillettei Felt, probably Zoophagous, was reared from this gall. The work of this insect appears to be common in Colorado since it has been repeatedly received from several correspondents.

THECODIPLOSIS Kieff.

1895 **Kieffer, J. J.** Soc. Ent. Fr., Bul. 64, p. 194
1896 ———— Wien. Ent. Zeit., 15:94, 100
1897 ———— Syn. Cecid. de Eur. & Alg., p. 35
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:285
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:51
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 184

This genus may be distinguished from Contarinia by costa not being interrupted at its union with the third vein, and by the long, broadly lobed dorsal and ventral plates, in connection with the stout, usually not very long ovipositor of the female. The type species is Cecidomyia brachyntera Schw.

The fifth antennal segment of the male is binodose, the distal enlargement with a length a little greater than the diameter, each with well-developed circumfili, the loops being rather sparse and moderately long. Palpi quadriarticulate, the third and fourth segments subequal. Subcosta unites with costa at the basal third, the third vein at the apex, the fifth at the distal third, its branch just before the basal half. Basal clasp segment stout, the terminal clasp segment greatly swollen basally; dorsal plate short, broadly emarginate, the lobes broadly rounded; ventral plate triangularly emarginate, the lobes divergent, hardly tapering, broadly rounded, setose; style short. The above characters were drafted from specimens determined by Dr J. J. Kieffer and generously donated to the Museum.

Several American species have been referred to this genus. Thecodiplosis ananassa Riley produces a gall on cypress twigs, while T. liriodendri O. S. inhabits a circular, somewhat convex blister mine on the leaf of the tulip, Liriodendron tulipiferae.

Key to Species

a Small species usually yellowish and with very few or no fuscous markings
  b Fifth antennal segment having the basal portion of the stem with a length at least three times its diameter

c Length 1 mm. Mesonotum dark brown, the fifth antennal segment having the basal portion of the stem with a length four times its diameter; setae and circumfili slightly produced dorsally. Reared from oak........................quercifolia Felt, C. 1015

bb Fifth antennal segment having the basal portion of the stem with a length two and one-half times its diameter

c Length 1 mm. Mesonotum yellowish brown, abdomen mostly dark brown. Reared from pine.................................. piniradiatae Snow & Mills, a2137

aa Moderate sized reddish or reddish brown species

b Length 1.25 mm. Abdomen light brown, the fifth antennal segment having the basal portion of the stem with a length one-half greater than its diameter, the fourth palpal segment twice the length of the third. Reared from Taxodium...........ananassa Riley, C. 926

bb Length 1.5 mm. Abdomen reddish brown, fifth antennal segment having the basal portion of the stem with a length three-fourths its diameter, the distal part with a length twice its diameter, the fourth palpal segment about as long as the third. Reared from a purplish blister gall on tulip leaf.....................liriodendri O. S.

bbb Length 1.5 mm. Abdomen yellowish, fifth antennal segment having the basal portion of the stem with a length thrice its diameter, the distal part with a length four and one-half times its diameter, the fourth palpal segment one-half longer than the third. Reared from wheat heads.........................mosellana Gehin, a2252

bbbb Length 1.75 mm. Abdomen reddish orange, fifth antennal segment having the basal portion of the stem with a length one-half greater than its diameter, the distal part with a length three and one-half times its diameter, the fourth palpal segment one-half longer than the third. Reared from fruit of Dulichium......dulichii Felt, a2219

bbbbb Length 2 mm. Abdomen reddish brown, fifth antennal segment having the basal portion of the stem with a length three-fourths its diameter, the distal part with a length one-half greater than its diameter, the fourth palpal segment one-half longer than the third................ hudsonici Felt, C. 3

bbbbbb Length 2 mm. Abdomen yellowish brown, fifth antennal segment having the basal portion of the stem with a length twice its diameter, the distal part with a length one-half greater than its diameter, the fourth palpal segment one-fourth longer than the third. Reared from a rosette gall on Zauschneria.........zauschneriae Felt, a2311

Thecodiplosis quercifolia Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 391

This species, received through the courtesy of the United States National Museum, was reared from oak August 6, 1883. The midge was labeled 2741^{03}, was evidently reared in connection with a Cynips gall numbered 2741 which was taken in Virginia July 20th of the same year.

Male. Length 1 mm. Antennae about twice the length of the body, thickly haired, light brown; 14 segments, the fifth with stems four and five times their diameters, respectively; terminal segment, distal enlargement produced, tapering apically to a long, stout, spindle-shaped appendage. Palpi; the first segment long, irregular, the second one-half longer, stout, subrectangular, the third one-fourth longer than the second, more slender, the fourth as long as the third, somewhat dilated. Mesonotum dark brown, the submedian lines indistinct. Scutellum reddish brown, postscutellum probably reddish brown. Abdomen light yellowish and with a dark fuscous spot dorsally on the third and fourth abdominal segments. Genitalia slightly fuscous. Wings long, slender; costa light brown; halteres pale yellowish. Legs a variable yellowish white; claws long, slender, strongly curved, the pulvilli as long as the claws. Genitalia; basal clasp segment very long, slender; an obtuse triangular basal process; terminal clasp segment long, greatly swollen basally; dorsal plate short, stout, deeply and roundly emarginate, the lobes rather broadly rounded.

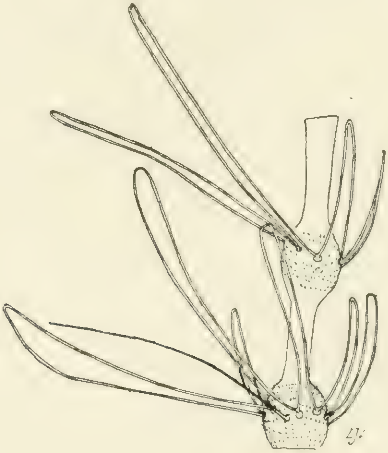

Fig. 40 Thecodiplosis quercifolia, fifth antennal segment of male (enlarged, original)

This species, in the prolongation of the setae and circumfili on the ventral face of the antennae, suggests a relationship with Bremia. There is, however, no trace of a low basal circumfilum found in this genus and, moreover, the claws, so far as we are able to ascertain, are simple. The midge is remarkable for the greatly prolonged antennae, due largely to an extension of the stems separating the enlargements. The wings are unusually long and slender and the same is true of the basal clasp segment. Type Cecid. 1015.

Thecodiplosis piniradiatae Snow & Mills

1900 **Snow, W. A. & Mills, Helen.** Ent. News, 11:489-93 (Diplosis)
1900 **Cannon, W. A.** Amer. Nat., 34:801-10 (Diplosis)

The midge discussed below represents a peculiar form approaching the European Thurauia in the narrow wings and greatly reduced circumfili, though separable therefrom by the structure of the male genitalia, especially the terminal clasp segment, the ovipositor and the triarticulate palpi. We tentatively referred this extreme form to Thecodiplosis, despite the reduction in palpal segments.

This species attacks the Monterey pine in California, causing a shortening of the needles and a swelling at the base. This injury was very noticeable in the autumn of 1897, and an examination of the stunted, swollen needles revealed an Itonid larva at the very base. The first adults were obtained in 1898 from affected branches brought into the laboratory.

Life history. The following is an abstract from Snow and Mills. There appears to be but one generation annually. Adults begin to issue about the middle of June and continue to appear until the first of March. Egg laying proceeds during this entire period. The pupae are of the same general color as the larvae, the thoracic region being dark. The body is covered with spinules as in the larvae. The breathing tubes are nonsegmented and are slightly folded over at the top. This species is not confined to Pinus radiata. It also attacks the following species: P. tuberculata, P. muricata, P. sabiniana, P. coulteri and P. sylvestris. All these pines are but slightly injured compared with the Monterey pine. This species has been found abundant at Stanford University and in small numbers at various places on the San Francisco peninsula and in the Santa Clara valley.

The female moves over the terminal buds, attempting at intervals to thrust her long, flexible ovipositor between the scales, it sometimes being bent like a bow. Two to 24 eggs are deposited in a mass, about 2 weeks being required for them to hatch. Old larvae, pupae or adults may be found from January into March. The newly hatched larvae immediately make their way to the basal part of the bud, remaining there through the summer and early winter and not pupating until December. The adults issue a few weeks or months later and the life cycle begins anew.

The insect is so abundant that three-fourths of the fascicles may be seriously injured, the leaves being mere rudiments of the normal structure.

Male. Length about 1 mm. Antennae one-half longer than the body, sparsely haired, yellowish brown; 14 segments, the fifth with stems two and one-half and two times their diameters; terminal segment produced, the basal portion of the stem with a length four times its diameter, the distal enlargement subglobose and separated by a deep and narrow constriction from a broadly ovate appendage. Palpi; first segment subquadrate, the second stout, with a length twice its diameter, the third slender, with a length fully twice the second and somewhat dilated. Mesonotum yellowish brown. Scutellum and postscutellum fuscous yellowish. Abdomen mostly dark brown. Wings hyaline, remarkably narrow, with a length fully two and one-half times the width; costa light brown, the third vein uniting with the margin well beyond the apex. Halteres whitish transparent. Legs fuscous yellowish, the tarsal segments darker; claws rather stout, evenly curved, the pulvilli longer than the claws. Genitalia; basal clasp segment stout, truncate, terminal clasp segment rather stout; dorsal plate narrowly and triangularly emarginate, the lobes obliquely truncate; ventral plate deeply and triangularly emarginate, the lobes obliquely and roundly truncate.

Female. Length 1 mm. Antennae nearly as long as the body, sparsely haired, yellowish brown; 14 segments, the fifth with a stem about one-third the length of the cylindric basal enlargement, which latter has a length twice its diameter, is slightly constricted near the basal third; terminal segment somewhat produced, tapering to an obtuse, knoblike apex. Palpi nearly as in the male. Mesonotum yellowish brown, the submedian lines fuscous yellowish. Scutellum and postscutellum fuscous yellowish. Abdomen dark brown basally, the distal segments fuscous yellowish. Wings slightly broader than in the male. Ovipositor as long as the body, the distal portion rather stout, the terminal lobes with a length three times their diameter, tapering slightly.

The above descriptions were drafted from cotypes kindly placed at our disposal through the courtesy of Prof. V. L. Kellogg, Stanford University, Cal. Represented in the state collections by Cecids. 767, 975 and a2137.

Larva. The larva is broadly elliptical, reddish yellow in color, and when full grown is from 1 mm to 1.5 mm long. The breastbone, while well chitinized in the later stages, is not visible in the newly hatched. There are no nipplelike spiracles and the skin is covered with fine spinules. The larva usually excretes a thick oval cocoon prior to pupation. (Abstract from Snow and Mills.)

Parasites. This species is subject to attack by several natural enemies: Polygnotus diplosidis Ashm., a parasite of Retinodiplosis inopis Osten Sacken, is an efficient parasite of this species, and a mite very like Pediculoides ventricosus is a valuable agent in destroying the eggs, larvae and pupae. The latter attaches itself by its mouth-parts and forelegs to the larva, clinging thereto until it succumbs. Larvae of Hemerobius and Chrysopa, and larvae and adults of Coccinellids and the nymphs of certain Reduviidae occur on the pines and probably assist in checking this insect. The ruby-crowned kinglet has been observed eating the midges.

Thecodiplosis ananassa Riley

1870 **Riley, C. V.** Am. Ent., 2:244 (Cecidomyia cupressi-ananassa)
1891 ——————— **& Howard, L. O.** Ins. Life, 4:125 (Polygnotus proximus Ashm. reared, Cecidomyia)
1906 **Felt, E. P.** Ins. Affec. Pk. & Wdld. Trees, N. Y. State Mus. Mem. 8, 2:755 (Cecidomyia)
1908 ——————— N. Y. State Mus. Bul. 124, p. 392 (Contarinia)
1912 ——————— N. Y. Ent. Soc. Jour., 20:242–43

This species produces a rather common gall on Cypress, Taxodium distichum. The galls appear to originate as small, globose or oval, densely pruinose swellings with rudimentary leaves and located near the tips of the smaller, tender shoots. They vary in length from 5 to 8 mm, are spongy, and the green interior contains a variable number of pale yellowish larvae grouped about the central axis of the shoot. At the same time we find more matured galls containing reddish or deep orange larvae, which would seem to indicate an extended period of flight and a prolonged oviposition. Transformations occur within the gall, exuviae being left protruding. From 3 to 8 larvae may occur in each swelling. Polygnotus proximus Ashm. MS. (Insect Life, 4:125) was reared from the gall produced by this midge.

Gall. Developing galls are globose or oval, densely pruinose, bear rudimentary leaves and are from 5 to 8 mm long. The fully developed gall may be 1.25 cm long, brown, and appears much as a small pineapple, owing to the numerous transverse elevations. The larvae in either type occur in oval cells grouped irregularly about the central axis.

Larva. The small larvae are pale yellowish, scarcely .5 mm long. The full-grown larvae have a length about 1.75 mm, are reddish orange or deep orange and possess a clove-shaped, dark-brown or black breastbone.

Doctor Riley described the living specimens as of a bright-red color, the head black and the thorax dusky above. The following was drafted from pinned specimens in the United States National Museum.

Male. Length 1.25 mm. Antennae one-fourth longer than the body, thickly haired, yellowish brown; 14 segments, the fifth with stems one-half and one and one-half times their diameters; terminal segment, distal enlargement fusiform, strongly constricted basally and tapering to a narrowly rounded apical process. Palpi; the first segment short, narrowly oval, the second a little longer, the third about as long as the second, the fourth nearly twice the length of the third. Mesonotum dark brown, the submedian lines thickly haired. Scutellum pale yellowish, postscutellum darker. Abdomen light brown (deep red in a living specimen), sparsely haired. Wings hyaline, costa light brown. Halteres yellowish basally, reddish brown apically. Coxae and base of femora pale yellowish, distal portion of femora, tibiae and tarsi mostly reddish brown, the two latter somewhat darker apically; claws long, stout, strongly curved, the pulvilli about half the length of the claws. Genitalia; dorsal plate long, broad, deeply and triangularly incised, the lobes obliquely truncate; ventral plate long, broad, truncate.

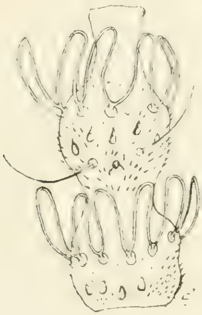
Fig. 41 Thecodiplosis ananassa, fifth antennal segment of male (enlarged, original)

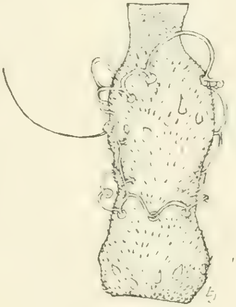
Fig. 42 Thecodiplosis ananassa, fifth antennal segment of female (enlarged, original)

Female. Length 1.75 mm. Antennae extending to the fifth abdominal segment, sparsely haired, light brown; 14 segments, the fifth with a stem one-fourth the length of the basal enlargement, which latter has a length thrice its diameter and is strongly constricted near the basal third; terminal segment produced, tapering to a narrowly rounded apex. Palpi; the first segment short, stout, the second one-half longer, stouter, the third as long as the second, more slender, the fourth one-half longer than the third, more slender. Ovipositor probably nearly as long as the abdomen, otherwise nearly as in the male. Type Cecid. 926.

Thecodiplosis liriodendri O. S.

1862 **Osten Sacken, C. R.** Mon. Dipt. N. A., 1:202 (Cecidomyia)
1889 **Jack, J. G.** Garden & Forest, 2:604–5 (Cecidomyia)
1890 **Riley, C. V. & Howard, L. O.** Ins. Life, 2:362–63 (Diplosis)
1892 **Beutenmuller, William.** Am. Mus. Nat. Hist. Bul., 4: 265 (Cecidomyia)
1904 ——— Am. Mus. Nat. Hist. Guide Leaflet 16, p. 25 (Cecidomyia)

1906 **Felt, E. P.** Ins. Affec. Pk. & Wdld. Trees, N. Y. State Mus. Mem. 8, 2:732 (Cecidomyia)

1908 ———— N. Y. State Mus. Bul. 124, p. 393 (Contarinia)

1910 **Stebbins, F. A.** Springf. Mus. Nat. Hist., Bul. 2, p. 33 (Contarinia)

This species is not rare on the tulip in the vicinity of Albany, and is very common farther south, particularly in North Carolina where it is sometimes so abundant as to mar seriously the foliage toward the end of the season. Our observations at Albany show that there are two and possibly more generations annually, while J. G. Jack, who studied this insect in the vicinity of Boston, states that there are three or more generations, the broods so overlapping that some larvae may almost always be found. He states that the first eggs are probably laid in the spring on the unfolding leaves, while the last larvae attain full growth about the end of September. They escape from the blister mine through a slit and enter the ground, the late appearing larvae probably remaining unchanged until spring.

Gall. A nearly circular, somewhat convex blister mine about 5 mm in diameter. There is a dark brown center surrounded by a light brown, irregular area which is slightly darker on its outer margin. The appearance is approximately the same on both surfaces, the coloration being a little deeper on the upper. The partly developed gall has a dark brown, slightly elevated, circular central part surrounded by pale green, which in turn is encircled by pale yellow, shading into pale green, and that into the color of the normal leaf tissue.

Male. Length 1.5 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems three-fourths and two times their diameters, respectively; terminal segment, distal enlargement greatly reduced, with a length about one-half greater than its diameter, apically a short, stout process. Palpi; probably quadriarticulate. Mesonotum reddish brown, submedian lines pale yellowish. Scutellum yellowish brown, postscutellum and abdomen reddish brown, the latter sparsely haired. Wings hyaline, costa light brown. Legs a variable brown; claws long, slender, strongly curved, the pulvilli apparently absent. Genitalia indistinct in the preparation.

Female. Length 1.5 mm. Antennae a little shorter than the body, sparsely haired, light brown; 14 cylindric subsessile segments, the fifth with a stem about one-fourth the length of the basal enlargement, which latter has a length two and one-half times its diameter and is slightly constricted near the basal third; terminal segment, basal enlargement slender, with a length five times its diameter and apically with a short, stout, subglobose appendage. Palpi; the first segment short, stout, irregularly subquadrate, the second a little longer, broadly oval, the third probably longer than the second, rather stout, the fourth apparently twice the length of the third. Color and other characters as in the opposite sex. Ovipositor apparently short, the terminal lobes short, stout, with a length about twice the diameter, narrowly rounded.

Thecodiplosis hudsonici Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 393 (Contarinia)

This species was taken on red cedar at Poughkeepsie, N. Y., April 19, 1906.

Male. Length 2 mm. Antennae probably a little longer than the body, thickly haired, light brown; 14 segments, the fifth with stems three-fourths and one and one-half times their diameters. Palpi; first segment rather broad, irregular, the length three times its diameter, the second a little longer, more slender, the third one-fourth longer than the second, the fourth one-half longer than the third, flattened, very broad. Mesonotum dark brown, the sublateral areas darker than the median; distinct clusters of hairs occur below the humeri; submedian lines ornamented with pale yellow hairs. Scutellum reddish, sparsely ornamented with yellowish setae. Abdomen reddish brown. Wings pale yellowish; halteres yellowish. Legs a variable yellowish or brown; claws rather slender, strongly curved. Genitalia; basal clasp segment slender; terminal clasp segment stout at base; dorsal plate broad, deeply and triangularly emarginate, the lobes broadly curved. Type Cecid. 3.

Thecodiplosis zauschneriae Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20:152–53

The midges were reared from rosette galls on Zauschneria californica collected by P. H. Timberlake, Whittier, Cal.

Thecodiplosis mosellana Gehin

1912 **Felt, E. P.** Econ. Ent. Jour., 5:287–88

The wheat midge of American wheat and rye fields is with very little question the above-named species and the extensive American literature purporting to deal with Cecidomyia or Diplosis tritici Kirby relates in all probability to this less-known European species. Other midges may be reared from wheat heads. The writer has described two other species, namely Prodiplosis fitchii and Itonida tritici, from material reared from wheat heads. Both of these seem to be associated species and of relatively slight economic importance.

The records of earlier injury in this country by wheat midge have been discussed so many times that there is no necessity of going over the data again. The life history and habits of this insect have been presented in some detail elsewhere and need be only mentioned at this time.

Thecodiplosis dulichii Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20:241–42

These midges were reared from the fruit of Dulichium arundinaceum collected by Miss Cora H. Clarke at Magnolia, Mass.

Thecodiplosis cockerelli Felt

1918 **Felt, E. P.** Econ. Ent. Jour., 11:381

The one female reared from an irregular, kidney-shaped enlargement of pine needles collected by Ivan Way in Colorado is provisionally referred to this genus. The insect is probably generally distributed in Colorado since it has been received from both Colorado Springs and Oxford.

DENTIFIBULA Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 389
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:284
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:51
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 174

The genus comprises a number of forms closely related to Contarinia and easily separated by the triarticulate palpi and the conspicuous triangular apical process of the basal clasp segment of the male. The terminal clasp segment is therefore subapical. The simple, strongly curved claws are about as long as the pulvilli. The third vein unites with costa a little before the apex of the wing (plate 38, figure 1, N. Y. State Mus. Bul. 124). The species are all small, pale yellowish forms. One was reared from Aspidiotus uvae and it is possible that the others are zoophagous. The type of the genus is Contarinia viburni Felt.

Key to Species

a Distal portion of antennal stem of the fifth segment long, with a length about five times the diameter; fifth tarsal segment of anterior legs as long as the fourth
  b Entire insect a pale yellowish orange. Taken on Viburnum........... viburni Felt, C. 210, 591
aa Distal portion of the stem of the fifth antennal segment rather short, with a length about four times its diameter; the fifth tarsal segment on the anterior legs longer than the fourth
  b Entire insect yellowish with the exception of a dark spot on the dorsal part of the abdomen; wing hairs curved; antennal setae rather fine, circumfili long. Taken on hickory................caryae Felt, 332b

bb Mesonotum yellowish brown, the remainder of the insect light yellowish; wing hairs nearly straight; antennal setae coarse; circumfili rather short. Reared from Aspidiotus uvae............cocci Felt, C. 1018

Dentifibula viburni Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 132; separate, p. 36 (Contarinia)
1908 ——— N. Y. State Mus. Bul. 124, p. 389

This species was taken on maple leaved arrow-wood, Viburnum dentatum, at Albany, N. Y., June 11, 1906 and captured on a window on the 17th.

Male. Length 1 mm. Antennae one-fourth longer than the body, thickly haired, pale straw; 14 segments, the fifth with stems two and one-half and five times their diameters; terminal segment somewhat produced, the distal enlargement narrowly oval. Palpi short, the first segment subquadrate, the second narrowly oval, the third one-half longer than the second, slender. Face yellowish. Mesonotum pale yellowish orange, slightly tinged with carmine dorsally. Scutellum and postscutellum pale orange. Abdomen bright orange with a fuscous area basally. Wings hyaline, costa pale straw. Legs pale straw, the articulations tinged with carmine; claws slender, evenly curved and as long as the pulvilli. Genitalia; dorsal plate short, broadly and triangularly emarginate, the lobes broadly rounded; ventral plate short, broad, broadly rounded. Type Cecid. 210.

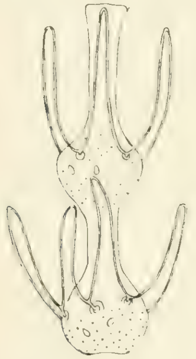

Fig. 43 Dentifibula viburni, fifth antennal segment of male (enlarged, original)

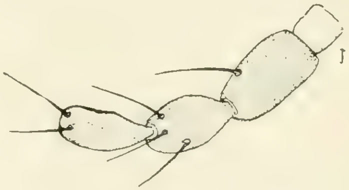

Fig. 44 Dentifibula viburni, palpus of male (enlarged, original)

Dentifibula caryae Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 132; separate, p. 36 (Contarinia)
1908 ———— N. Y. State Mus. Bul. 124, p. 389

This yellowish species was taken on hickory, Carya, at Albany, N. Y., June 19, 1906.

Male. Length .75 mm. Antennae longer than the body, thickly haired, pale yellowish; 14 segments, the fifth with stems two and one-half and four times their diameters, respectively; the loops of the circumfilum long; terminal segment somewhat reduced, the basal portion of the stem short, the distal enlargement broadly oval. Palpi short, the first segment short, stout, irregular, the second broadly oval, the third a little longer, more slender. The entire insect is yellowish with the exception of a dark basal spot on the abdomen. Wings hyaline, costa pale yellowish; membrane sparsely clothed with long, curved hairs. Legs pale yellowish; tarsi fuscous; claws simple, evenly curved and as long as the pulvilli. Genitalia; dorsal plate short, broadly and triangularly emarginate, the lobes broadly rounded; ventral plate long, broadly rounded. Type Cecid. 332b.

Dentifibula cocci Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 389
1914 ———— Econom. Ent. Jour., 7:458

This yellowish brown species, loaned through the courtesy of the United States National Museum, was reared May 1, 1897 from Aspidiotus uvae Comst., taken in Illinois.

Male. Length 1 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems three and four times their diameters, respectively, the loops of the circumfilum rather short; terminal segment with the basal portion of the stem reduced, the distal enlargement narrowly oval. Palpi short, the first segment subquadrate, the second narrowly oval, the third one-half longer, slightly expanded. Mesonotum light yellowish brown. Scutellum, postscutellum and abdomen light yellow, the latter with an oval, fuscous spot basally and rather thickly haired. Wings hyaline, costa light brown, the membrane rather thickly clothed with nearly straight hairs; halteres yellowish transparent. Legs pale yellowish, the distal tarsal segments light brown, the simple claws slender, evenly curved, hardly as long as the pulvilli. Genitalia; dorsal plate short, deeply and narrowly incised, the lobes broadly rounded; ventral plate short, broadly rounded. Type Cecid. 1018.

Two Indian species, D. ceylanica Felt (N. Y. Ent. Soc. Jour., 23:175, '15) and D. obtusilobae Felt (N. Y. Ent. Soc. Jour., 23:176, '15) were reared from twigs of Cassia alata infested with a Hemichionaspis and from Piper nigrum infested with Hemichionaspis aspidistrae, respectively. These two Indian forms are readily separated from American species by the shorter and relatively broader apical lobe of the basal clasp segment. The American representatives may be zoophagous.

PECTINODIPLOSIS n. g.

The species referred to this genus differs so markedly from Thecodiplosis, from which it is distinguished by the triarticulate palpi, and from Dentifibula in genital characters that a new genus is proposed with Contarinia erratica Felt as the type. The triarticulate palpi, the broadly rounded apical lobe on the basal clasp segment and the convolute strongly curved terminal clasp segment with its long, comblike teeth serve to distinguish it from all other bifili.

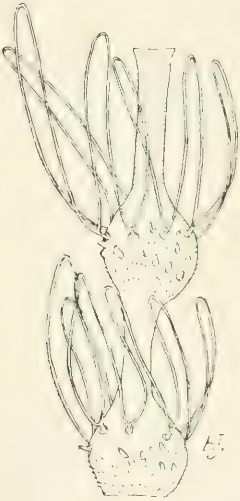

Fig. 45 Pectinodiplosis erratica, fifth antennal segment of male (enlarged, original)

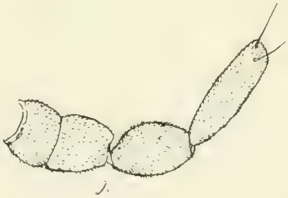

Fig. 46 Pectinodiplosis erratica, palpus of male (enlarged, original)

Pectinodiplosis erratica Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 391 (Contarinia)

This species, received through the courtesy of the United States National Museum, was reared April 16, 1896 and bears the number 205^{037}.

Male. Length 1 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems three and four times their diameters, respectively; terminal segment with distal portion irregular, fusiform. Palpi; the first segment short, stout, subquadrate, the second one-half longer, narrowly oval, the third one-half longer than the second, more slender. Thorax and abdomen mostly pale yellowish, the distal segments of the abdomen and genitalia variably clouded with fuscous. Wings subhyaline, there being an ill-defined, broad, fuscous band more pronounced on the posterior margin and near the basal fourth. The apical fourth of costa, including most of the apex of the wing, is fuscous with a faint shading on the adjacent membrane and a small, fuscous area at the apex of the fifth vein; halteres yellowish transparent. Coxae and base of femora pale yellowish, the distal portion of femora dark brown; tibiae mostly pale yellowish; tarsi with two basal segments dark brown, the distal segment pale yellowish; claws long, slender, evenly curved, the pulvilli about two-thirds the length of the claws. Genitalia; basal clasp segment long, broadly curved, distally with a broadly rounded internal lobe; terminal clasp segment short, irregular, swollen basally, convolute near the middle, the apex strongly recurved, the margin dentate; dorsal plate short, broad, deeply and roundly emarginate, the lobes roundly truncate; ventral plate short, stout, truncate. Type Cecid. 1021.

Group Trifili

APHIDOLETES Kieff.[1]

1904 **Kieffer, J. J.** Soc. Sci. Brux. Ann., 28:19–22
1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 396
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:289
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:53
1912 **Kieffer, J. J.** Ent. Soc. Fr. Bul. 6, p. 137–38
1913 ——— Gen. Insect., fasc. 152, p. 163

The genus presents a superficial resemblance to Bremia Rond, though it is easily distinguished by structural and biological differences. Aphidoletes and Bremia both have the setae and circumfili of the male antennae greatly produced on the dorsal face of the segments. This genus is easily separated in the male from Bremia by the three well-developed circumfili (figure 47) on the flagellate antennal segments; and by the pulvilli being long, usually over one-half the length of the claw. The ventral plate in the male is expanded distally and the anterior and midclaws are strongly unidentate; the posterior claws are simple. The wing is shown on plate 7, figure 4. The type of the genus is A. abietis Kieff.

All the species of Aphidoletes presumably prey on aphids or plant lice.

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[1] Kieffer refers the American species placed here to Phaenobremia

Key to Species

a Legs very slender with a length two and one-half or three times that of the body; tibiae distinctly though slightly swollen apically
  b Posterior tibia as long as the femora, the second tarsal segment longer than tibia; body fuscous, the abdomen thickly clothed with pale hairs................................hamamelidis Felt, C. 401
  bb Posterior tibia shorter than the femora
    c Abdomen dark brown; scutellum reddish brown.................. marginata Felt, C. 1224
    cc Abdomen reddish brown; scutellum light brown.................. fulva Felt, C. 530
    ccc Abdomen reddish brown; scutellum light yellow.................. recurvata Felt, C. 825
    cccc Abdomen yellowish orange; scutellum yellowish...rosivora Coq.

aa Legs rather stout, with a length rarely twice that of the body; tibiae not distinctly swollen apically
  b Posterior tibia nearly as long as the femora
    c Second tarsal segment of posterior legs longer than the tibia. Abdomen reddish brown; scutellum pale yellowish brown, legs yellowish brown...................meridionalis Felt, C. 1005
    cc Second tarsal segment of posterior legs almost as long as tibia; abdomen grayish, thickly haired; scutellum yellowish; legs light brown................................cucumeris Lintn.
  bb Posterior tibia three-fourths the length of femora
    c Second tarsal segment of posterior legs longer than tibia and first tarsal segment
      d Abdomen pale reddish orange; scutellum yellowish basally, red apically; legs fuscous yellow.....flavida Felt, C. 666
      dd Abdomen fuscous yellow; scutellum light fuscous yellow; legs light brown.......................borealis Felt, a1160
    cc Second tarsal segment of posterior legs as long as tibia and the first tarsal segment
      d Third tarsal segment of posterior legs one-half the length of the second. Abdomen dark reddish brown; scutellum reddish orange..........................marina Felt, C. 581
      dd Third tarsal segment of posterior legs more than one-half length of second segment. Abdomen yellowish brown, the basal segment fuscous brown, scutellum yellowish red....... basalis Felt, a1722

Aphidoletes hamamelidis Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 125; separate, p. 29 (Bremia)
1908 ———— N. Y. State Mus. Bul. 124, p. 397

The male was taken June 27, 1906 on witchhazel, Hamamelis virginiana, at Albany, N. Y.

Male. Length 1.5 mm. Antennae longer than the body, thickly haired, fuscous; 14 segments, the fifth with stems twice and three times their diameters; terminal segment, distal enlargement prolonged, subcylindric, a rather short, fusiform terminal appendage. Palpi; the first segment subquadrate, the second twice the length of the first, rather stout, the others probably successively longer and more slender. Head black, body fuscous, the abdomen clothed with pale hairs. Wings hyaline, costa pale brown. Halteres pale.

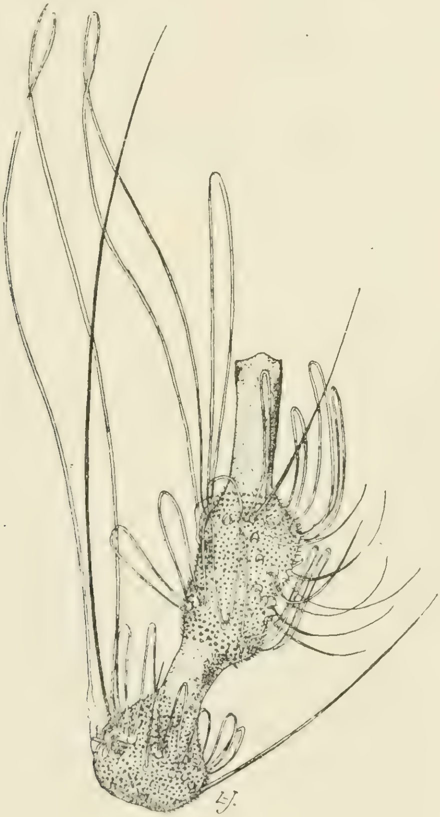

Fig. 47 Aphidoletes hamamelidis, fifth antennal segment of male (author's illustration)

Legs a nearly uniform pale straw; claws long, slender, strongly curved. Type Cecid. 401. (See plate 7, fig. 4 and plate 9, fig. 2)

Aphidoletes marginata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397

The male was taken on a window at Nassau, N. Y., July 15, 1907.

Male. Length 1.5 mm. Antennae twice as long as the body, thickly haired, light brown; 14 segments, the fifth with stems two and one-half and three times their diameters; terminal segment, distal enlargement greatly produced and almost divided near the middle, the terminal portion long, slender, fingerlike. Palpi; the first segment short, stout, the second a little longer, stouter, the third one-half longer and more slender than the second and the fourth a little longer and more slender than the third. Mesonotum dark brown, the submedian lines sparsely haired. Scutellum reddish brown, postscutellum dark brown. Abdomen sparsely haired, dark brown, the segments narrowly margined posteriorly with fuscous. Genitalia yellowish. Wings hyaline, costa light brown; halteres reddish basally, fuscous brown apically. Legs a nearly uniform light straw, claws long, stout, strongly curved, pulvilli nearly as long as the claws. Type Cecid. 1224.

Aphidoletes fulva Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397

This reddish brown male was taken July 17, 1906 on blackberry, Rubus, at Albany, N. Y.

Male. Length 1.3 mm. Antennae one-half longer than the body, rather thickly haired, dark brown, fuscous basally, the fifth with stems three and four times their diameters, respectively; terminal segment, basal portion of the stem greatly produced, the distal enlargement constricted near the middle and with a length four times its diameter. Palpi; the first segment short, broadly oval, the second nearly twice the length of the first, the third one-half longer than the second, and the fourth a little longer than the third, slightly dilated; face fuscous. Mesonotum dark brown, the narrow, reddish submedian lines thickly haired. Scutellum light brown, yellowish apically, sparsely yellow-haired, postscutellum dark brown. Abdomen reddish brown, the second and third segments fuscous. Genitalia pale yellowish, thickly clothed with long, white hairs. Wings hyaline, costa light brown; halteres yellowish white. Legs nearly uniform fuscous straw, pulvilli as long as the claws. Type Cecid. 530.

Aphidoletes recurvata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397

The male was taken in August 1905 at Brookline, Mass., by C. W. Johnson.

Male. Length 2 mm. Antennae a little longer than the body, thickly long haired, dark brown; 14 segments, the fifth with stems each two and one-half times their diameters. Palpi; the first segment short, irregularly oval, the second rather stout, twice the length of the preceding, the third one-half longer and more slender than the second, the fourth nearly as long as the third, expanded. Face fuscous, eyes large, black. Mesonotum dark brown, submedian lines narrow, yellowish, the posterior median area reddish yellow. Scutellum pale yellow, postscutellum reddish yellow. Abdomen reddish brown, lighter basally. Wings hyaline, costa light brown. Halteres a nearly uniform yellowish transparent, slightly fuscous distally. Legs fuscous yellowish, the distal tarsal segments light brown; claws stout, strongly curved basally, the pulvilli as long as the claws. Type Cecid. 825. (See plate 9, fig. 1.)

Aphidoletes rosivora Coq.

1900 **Coquillett, D. W.** U. S. Dept. Agric., Div. Ent., Bul. 22, n. s., p. 46–47 (Diplosis)

1911 **Felt, E. P.** Econ. Ent. Jour., 4:468 (Clinodiplosis)

This species was associated with Dasyneura rhodophaga Coq., though from the habits of allied species it was evidently preying upon rose aphids. A study of type material enabled us to establish the correct generic position of the species.

Male. Length 1.5 mm. Antennae twice the length of the body, thickly haired, brown; 14 segments, the fifth with stems three and three and one-half times their diameter; terminal segment with the basal portion of the stem and the distal enlargement greatly produced, the latter with a length five times its diameter, broadly constricted near the basal third and apically with a long, fingerlike process. Palpi yellowish, first segment quadrate, the second with a length thrice its diameter, the third one-half longer than the second, slender, the fourth a little longer than the third. Mesonotum light brown, the submedian lines yellowish. Scutellum and postscutellum yellowish, the abdomen yellowish orange. Halteres whitish transparent, slightly reddish apically; claws long, slender, strongly curved.

Female. Length 2 mm. Antennae nearly as long as the body, sparsely haired, brown; 14 segments, the fifth with a stem one-fourth the length of the cylindric basal enlargement, which latter has a length three and one-half times its diameter; terminal segment, basal enlargement with a length fully five times its diameter and a stout appendage. Mesonotum light brown, submedian lines yellowish. Scutellum and postscutellum yellowish. Abdomen yellowish orange. Ovipositor short, the lobes narrowly ovate. Other characters as in the male.

Aphidoletes meridionalis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397

1916 **Davis, J. J.** Jour. Agr. Research, 6:883–87 (biology)

The larvae of this reddish brown male were observed preying on Siphonophora liriodendri Mon. at Washington, D. C. The eggs hatched July 4, 1895, the larvae pupated July 7th to 8th and a number of flies issued on the 15th and 16th. Apparently the same form was reared by Prof. C. P. Gillette at Fort Collins, Col., from Aphis gossypii. He states that this species is particularly destructive to plant lice in the insectary and is not uncommon out of doors, attacking different species of plant lice.

Male. Length 1 mm. Antennae probably one-half longer than the body, thickly haired, light reddish brown; 14 segments, the fifth with stems two and three times their diameters respectively; terminal segment having the distal enlargement subcylindric, with a length four times its diameter and a long, slender, fingerlike process apically. Palpi; first segment subquadrate, the second with a length over twice its diameter, the third one-half longer, more slender, the fourth as long as the third, more slender. Mesonotum dark brown, shining, the submedian lines sparsely haired. Scutellum pale yellowish brown, postscutellum dark brown. Abdomen a variable reddish brown, the basal segments and genitalia lighter. Wings; costa light brown. Halteres, yellowish transparent. Coxae and base of femora yellowish, the distal portion of femora, tibiae and tarsi light yellowish brown; claws long, strongly curved, the pulvilli shorter than the claws. Type Cecid. 1005.

Aphidoletes cucumeris Lintn.

1888 **Lintner, J. A.** Count. Gent., 53:725 (Cecidomyia)
1889 ——— Injur. & Other Ins. N. Y., 5th Rep't, p. 306 (Cecidomyia)
1893 ——— Injur. & Other Ins. N. Y., 8th Rep't, p. 212 (Cecidomyia)
1896 ——— Injur. & Other Ins. N. Y., 11th Rep't, p. 165–68 (Cecidomyia)
1897 **Felt, E. P.** Psyche 8, p. 4, 5 (Cecidomyia)
1908 ——— N. Y. State Mus. Bul. 124, p. 397
1909 ——— Ent. Soc. Ont., 39th Rep't, p. 44
1914 ——— Econom. Ent. Jour., 7:458

This species was at first credited with producing small, irregular, subovate, downy galls on the shoots of muskmelon, Cucumis melo, a deformity which unquestionably should be attributed to Contarinia setigera Lintn. The midges were reared in association with the above-mentioned form in August 1888 from material originating at Lowell, Mass.

Two small parasitic flies, Lysiphlebus cucurbitaphidis Ashm. and Isocratus vulgaris Walk., were reared from the infested melon tips and were probably parasitic upon the common cucumber plant lice with which the leaves were infested.

Aphidoletes flavida Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397

The pale, reddish orange male was taken July 24, 1906 on maple at Albany, N. Y.

Male. Length 2 mm. Antennae a little longer than the body, thickly haired, light brown, fuscous yellowish basally; 14 segments, the fifth with stems two and three and one-half times their diameters, respectively; terminal segment with the distal enlargement irregular, produced, with a length four times its diameter and a long, slender process apically. Palpi; first segment subquadrate, with a length over twice its diameter, the second one-half longer, stouter, the third one-half longer than the second, more slender, the fourth a little longer than the third, more slender; face fuscous yellowish. Mesonotum dark brown, the submedian lines yellowish. Scutellum reddish, yellowish basally, postscutellum pale yellowish. Abdomen pale reddish orange, the segments narrowly margined posteriorly with fuscous, the latter prolonged on the median line and with short, transverse lines narrowly separated from the hind margin laterally, the segments ventrally broadly margined posteriorly with fuscous. Genitalia yellowish. Wings, costa yellowish brown; halteres mostly pale yellowish, slightly fuscous. Legs mostly fuscous yellowish; claws long, strongly curved, the pulvilli shorter than the claws. Type Cecid. 666.

Aphidoletes borealis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397
1914 ———— Econom. Ent. Jour., 7:458

This fuscous yellowish midge was reared at Albany, N. Y., August 7, 1907 from tulip leaves bearing galls of Thecodiplosis liriodendri O. S. and presumably infested by aphids upon which the larvae of this species probably subsists.

Male. Length 2.5 mm. Antennae one-half longer than the body, rather thickly haired, light brown; 14 segments, the fifth with stems two and one-half and three and one-half times their diameters, respectively; terminal segment having the distal enlargement strongly constricted near the middle, with a length fully four times its diameter and a stout, fingerlike process apically. Palpi; first segment irregularly subquadrate, the second narrowly oval, with a length two and one-half times its diameter, the third one-half longer than the second, more slender, the fourth a little longer and more slender than the third. Mesonotum dark brown, the submedian lines fuscous yellowish. Scutellum light fuscous yellowish, postscutellum and abdomen slightly darker, the latter with irregular, fuscous markings basally and pale orange distally, the segments margined posteriorly with short, fuscous setae. Wings; costa reddish brown. Halteres yellowish transparent, fuscous subapically. Legs mostly a uniform light brown; claws slender, strongly curved, the pulvilli shorter than the claws.

Female. Length 1.75 mm. Antennae nearly as long as the body, sparsely haired, light brown; 14 segments, the fifth with a stem about one-fifth the length of the cylindric basal enlargement, which latter has a length three and one-half times its diameter; distal segment cylindric, with a length five times its diameter and a rather long, stout, fingerlike process apically. Mesonotum dark brown, the submedian lines thickly haired. Scutellum yellowish orange, postscutellum a little darker. Abdomen dark brown, sparsely haired, pleurae fuscous yellowish. Halteres yellowish transparent. Legs a nearly uniform yellowish fuscous. Ovipositor short, the terminal lobes narrowly oval, with a length nearly three times the width. This female is provisionally associated with the above described male. Type Cecid. a1160.

Aphidoletes marina Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397
1914 ——— Econom. Ent. Jour., 7:458

The reddish brown male was taken July 14, 1906 at Huguenot Park, Staten Island, N. Y.

Male. Length 2 mm. Antennae one-half longer than the body, thickly haired, light brown, fuscous basally; 14 segments, the fifth with stems two and one-half and three and one-half times their diameters, respectively. Palpi; first segment subquadrate, the second broadly oval, with a length two and one-half times its diameter, the third longer and more slender, the fourth one-half longer than the third, more slender. Face fuscous. Mesonotum dark brown, submedian lines yellowish. Scutellum yellowish orange, postscutellum fuscous yellowish. Abdomen dark reddish brown, sparsely clothed with yellowish setae. Wings; costa reddish brown. Halteres semitransparent. Legs a nearly uniform pale straw; claws long, slender, the pulvilli about half the length of the claws. Type Cecid. 581.

Aphidoletes basalis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397
1914 ——— Econom. Ent. Jour., 7:458

This yellowish brown male was reared at Albany, N. Y., October 4, 1907 from tansy, Tanicetum vulgare, probably infested by aphids.

Male. Length 1.75 mm. Antennae one-half longer than the body, thickly haired, pale straw, fuscous yellowish basally; 14 segments, the fifth with stems two and one-half and four times their diameters, respectively; distal segment irregular, with a length four times its diameter and a slender, fingerlike process apically. Palpi; basal clasp segment subquadrate, the second broadly oval, with a length two and one-half times its diameter, the third one-half longer, slender, the fourth one-half longer than the third. Face fuscous yellowish. Mesonotum dark brown, the submedian lines sparsely haired. Scutellum dark red, postscutellum fuscous yellowish. Abdomen sparsely haired, yellowish brown, the basal segments fuscous brown, the membrane and pleurae fuscous yellowish; venter yellowish brown; genitalia yellowish. Wings; costa reddish brown.

Halteres yellowish basally, reddish brown apically. Coxae and femora basally, pale yellowish; femora distally, tibiae and tarsi a variable fuscous straw; claws long, slender, strongly curved, the pulvilli nearly as long as the claws. Type Cecid. a1722.

BREMIA Rond.

1860 **Rondani, C.** Soc. Sci. Nat. Milano Atti, 2:4
1895 **Rübsaamen, E. H.** Ent. Nachr., 21:186
1896 **Kieffer, J. J.** Wien. Ent. Zeit., 15:92, 95
1897 ———— Syn. Cecid. de Eur. & Alg., p. 27
1900 ———— Soc. Ent. Fr. Ann., 69:447
1904 ———— Soc. Sci. Brux. Ann., 28:19–22
1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 394
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:288
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:53
1912 **Kieffer, J. J.** Ent. Soc. Fr. Bul. 6, p. 137–38
1913 ———— Gen. Insect., fasc. 152, p. 165

This genus was erected with C. decorata Winn. as the type, it being distinguished from all other known Diplosids by the greatly produced hairs on one side of the antennae. C. aphidimyza Rond., a zoophagous species, was also noticed and assumed to belong to the same genus. Later Kieffer showed there were marked structural differences between the two forms and that these morphological variations were accompanied by a divergence in habits.

This genus, like Aphidoletes, has the antennal setae and circumfili greatly prolonged on the dorsal face of the segments. The male may be distinguished from all other Cecidomyiidae known to us by the low rudimentary circumfilum occurring on the base of the distal enlargement of the flagellate antennal segments (figure 48). The pulvilli are very short or rudimentary, the anterior claws only being unidentate. The wing is illustrated on plate 8, figure 7. The ventral plate in the male tapers distally, presenting a very different appearance from that obtaining in Aphidoletes. Members of this genus are said by Kieffer to be xylophagous. Recent changes in generic grouping do not appear to be justified by American forms and have therefore not been followed.

Key to Species

a Distal enlargement of the fifth antennal segment of the male produced, with length one-half greater than its diameter, the terminal clasp segment distinctly enlarged subapically
  b Abdomen dark yellowish brown, length 1.3 mm; stems of the fifth antennal segment in the male one and one-half and three and one-half times their diameters, respectively . . . . borealis Felt, C. 1497

bb Abdomen yellowish basally, dark brown apically; length 1.5 mm, the fifth antennal segment having stems with a length three and four and one-half times their diameters respectively....sylvestris n. sp. Cecid. 1746

aa The distal enlargement of the fifth antennal segment of the male only slightly produced, with a length about one-fourth greater than its diameter, the terminal clasp segment tapering uniformly

- *b* Stems of the fifth antennal segment of the male distinctly unequal
  - *c* Stems of the fifth antennal segment of the male with a length two and one-half and three and one-half times their diameters, respectively
    - *d* Abdomen mostly yellowish brown, length 1.5 mm............. montana Felt, C. 1366
  - *cc* Stems of the fifth antennal segment of the male with a length three and four and one-half times their diameters, respectively
    - *d* Abdomen yellowish brown, length 1.25 mm, the dorsal plate short, broad, triangularly emarginate, the lobes broadly and roundly emarginate.........podophyllae Felt, C. 352
    - *dd* Abdomen yellowish brown, length 1.2 mm, dorsal plate very broadly and roundly emarginate, the lateral margins truncate tristis Felt, C. 1475
    - *ddd* Abdomen fuscous, length 1.5 mm.......filicis Felt, C. 397
- *bb* Stems of the fifth antennal segment of the male nearly equal, each with a length three and one-half times their diameter
  - *c* Abdomen fuscous yellowish, apically pale orange, length 1 mm..... caricis Felt, C. 292

Bremia podophyllae Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 126; separate, p. 29–30
1908 ——— N. Y. State Mus. Bul. 124, p. 395

This species was taken June 21, 1906 sweeping Mayapple, Podophyllum peltatum, at Albany, N. Y.

Male. Length 1.25 mm. Antennae twice as long as the body, thickly haired, dark brown, yellowish basally; 14 segments, the fifth with stems three and three and one-half times their diameters. Palpi; the first segment subquadrate, the second a little longer, tapering, the third longer and more slender than the second, the fourth one-fourth longer than the third, more slender. Face pale yellowish. Mesonotum dark brown, submedian lines yellowish, sparsely setose. Scutellum light yellow, sparsely setose, postscutellum light yellow. Abdomen yellowish brown, thickly setose, the posterior margins of the segments and genitalia slightly fuscous. Wings hyaline, costa dark brown. Halteres pale yellowish basally, fuscous yellowish apically. Legs pale brown; claws long, slender. Genitalia; dorsal plate broad, triangularly incised, the lobes subtruncate, the latero-distal border slightly emarginate. Type Cecid. 352. (See plate 9, fig. 3)

Bremia filicis Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 125; separate, p. 29
1908 ——— N. Y. State Mus. Bul. 124, p. 395

This male was taken June 26, 1906 sweeping low ferns or brakes at Karner, N. Y.

Male. Length 1.5 mm. Antennae twice the length of the body, thickly haired, fuscous; 14 segments, the fifth with the stems each three times their diameter; terminal segment, distal enlargement produced and apically with a long, spindle-shaped appendage. Palpi; the first segment subrectangular, the second a little longer, the third one-half longer than the second, more slender, the fourth a little longer than the third. Mesonotum fuscous. Scutellum and postscutellum yellowish. Abdomen fuscous, clothed with long hairs. Wings hyaline, costa dark brown. Halteres fuscous. Legs long, slender, the anterior pair fuscous, the posterior gray; claws stout, strongly curved basally. Genitalia; dorsal plate short, broad, broadly emarginate; ventral plate shorter, broad, broadly emarginate. Type Cecid. 397. (See plate 7, fig. 5)

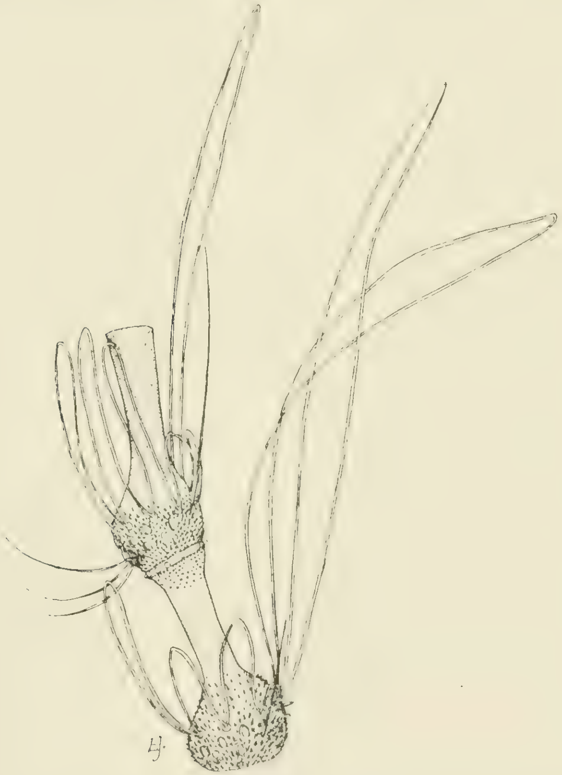

Fig. 48 Bremia filicis, fifth antennal segment of male (author's illustration)

Bremia caricis Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 128; separate, p. 32 (Mycodiplosis)
1908 ———— N. Y. State Mus. Bul. 124, p. 395

This fuscous, yellowish species was taken June 15, 1906 on sedge, Carex, at Nassau, N. Y.

Male. Length 1 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems thrice their diameters. Palpi; the first segment subquadrate, the second one-fourth longer, more slender, the third a little longer than the second, more slender, the fourth longer than the third, more slender. Face pale yellowish. Mesonotum dark brown, the submedian lines yellowish, sparsely setose. Scutellum light yellow, sparsely setose, postscutellum orange yellow. Abdomen thickly setose, fuscous yellow, the terminal segments pale orange. Genitalia fuscous yellow. Wings hyaline, costa light brown. Halteres yellowish transparent basally, fuscous apically. Legs pale straw; claws long, strongly curved basally. Genitalia; dorsal plate broad, deeply and triangularly incised, the lobes broadly rounded; ventral plate long, stout, slightly incised, the lobes narrowly rounded. Type Cecid. 292. (See plate 8, fig. 6, plate 9, fig. 4)

Bremia borealis Felt

1914 **Felt, E. P.** N. Y. Ent. Soc. Jour., 22:130–31

This species, distinguished by the longer distal enlargement of the fifth antennal segment and the distinct subapical swelling of the terminal clasp segment, was collected by C. P. Alexander August 24, 1909, in a quarry at Woodworth's lake in the Adirondacks, altitude 1540 feet.

Bremia tristis Felt

1914 **Felt, E. P.** N. Y. Ent. Soc. Jour., 22:131

This midge, allied to B. podophyllae Felt, was taken by C. P. Alexander August 10, 1909, in a stone quarry at Woodworth's lake in the Adirondacks, altitude 1500 feet. It is most readily distinguished from its near relatives by the broadly and roundly emarginate dorsal plate.

Bremia montana Felt

1914 **Felt, E. P.** N. Y. Ent. Soc. Jour., 22:131–32

This midge, distinguished from other species of Bremia having the antennal stems unequal by the length of the basal portion, was taken by C. P. Alexander July 21, 1909, on Impatiens at Mountain lake in the Adirondacks, altitude 1590 feet.

YOUNGOMYIA Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 398–99
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:289
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:53
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 243

This genus comprises a number of rather large, yellowish or brownish species allied to Dicrodiplosis Kieff. and easily distinguished therefrom by the greatly produced terminal clasp segment and the thickly setose ventral plate and harpes. The male has the flagellate antennal segments trinodose, the distal enlargement being distinctly divided, sometimes by an appreciable stem. The palpi are quadriarticulate. Wings large, rather hairy, the third vein uniting with costa well beyond the apex of the wing, the fifth near the distal fourth, its branch near the basal half. The legs are long; claws stout, unidentate, the pulvilli being about half as long as the claws. The dorsal plate is broadly triangular, the lobes internally with a few stout setae; ventral plate long, stout, broadly rounded and thickly setose apically, the harpes tapering and thickly setose. Type Dicrodiplosis podophyllae Felt.

The female has the fifth antennal segment with the stem about one-fourth the length of the cylindric basal enlargement, which latter has a length about three to four times its diameter. The ovipositor is short, stout, the lobes being unusually large and orbicular. Rearings show that members of this genus display a marked preference for floral buds, Y. umbellicola O. S. and Y. vernoniae having been reared, respectively, from the blossoms of the elder and ironweed. Another species, Y. quercina, lives in a subglobular gall on the under side of young leaves of the running oak.

Key to Species

Males

a Abdomen reddish brown, the basal and distal portion of the stem of the fifth antennal segment with a length two and one-half and twice their diameters, respectively, the internal basal lobe of the basal clasp segment quadrate.......................... podophyllae Felt, C. 207

aa Abdomen dark red, the stems of the fifth antennal segment each with a length twice the diameter, the internal basal lobe of the basal clasp segment triangular......................... rubida Felt, C. 423

aaa Abdomen yellowish brown, the basal and distal stems of the fifth antennal segment with a length one and one-half and two and one-half times their diameters, respectively, the internal basal lobe of the basal clasp segment rounded apically................ vernoniae Felt, C. 973

aaa1 Abdomen yellowish brown, the fifth antennal segment having the stems, each with a length two and one-half times the diameter, the internal basal lobe of the basal clasp segment rounded apically............... quercina Felt, C. 1009

a1aaa Abdomen fuscous yellowish, the fifth antennal segment having the stems with a length one-half and twice their diameters, respectively, the internal lobe of the basal clasp segment narrowly triangular and thickly setose........................pennsylvanica Felt, C. 1395

Females

a Mesonotum light yellowish brown; abdomen yellowish brown, the fifth antennal segment having the basal enlargement with a length three and one-half times its diameter.......umbellicola O. S., C. 875

aa Mesonotum light reddish brown; abdomen dark yellowish brown, the fifth antennal segment having the basal enlargement with a length three times its diameter.................vernoniae Felt, C. 973

aaa Mesonotum dark brown; abdomen yellowish orange, the fifth antennal segment having the basal enlargement with a length four times that of its diameter...........................producta n. sp., C. 474

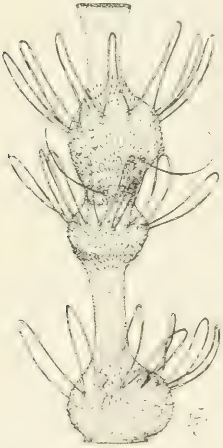

Fig. 49 Youngomyia podophyllae, fifth antennal segment of male (enlarged, original)

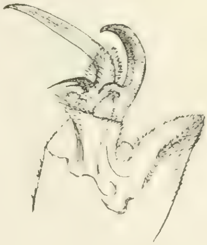

Fig. 50 Youngomyia podophyllae, side view of claw of male (enlarged, original)

Youngomyia podophyllae Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 126; separate, p. 30 (Dicrodiplosis)

1908 ———— N. Y. State Mus. Bul. 124, p. 399

This reddish brown male was taken June 11, 1906 on Mayapple, Podophyllum peltatum, at Albany, N. Y.

Male. Length 2 mm. Antennae as long as the body, thickly haired, dark brown, yellowish basally; 14 segments, the fifth trinodose, with the two longer stems two and one-half and two times their diameters; terminal segment, basal portion of the stem greatly produced, distinctly swollen near its middle, the distal two enlargements separated by a short stem, the distal one obpyriform and with a thickly haired, slender, spindle-shaped appendage, the latter swollen basally. Palpi; the first segment quadrate, the second twice the length of the first, the third a little longer than the second, more slender, the fourth a little shorter, more slender. Face yellowish. Mesonotum dark brown, the submedian lines yellowish, sparsely setose. Postscutellum yellowish. Abdomen reddish brown, the basal segments darker, each segment margined posteriorly with fuscous setae. Wings hyaline, costa light brown. Halteres yellowish transparent basally, yellowish fuscous apically. Legs pale brown, lighter ventrally; tarsi slightly darker; claws stout, slightly curved, unidentate. Genitalia; basal clasp segment stout, internally with a heavy, subquadrate basal process; terminal clasp segment slightly swollen at the base; dorsal plate broad, deeply and triangularly emarginate, the lobes long, slender, narrowly rounded; ventral plate stout, tapering, subtruncate. Type Cecid. 207. (See plate 7, fig. 2)

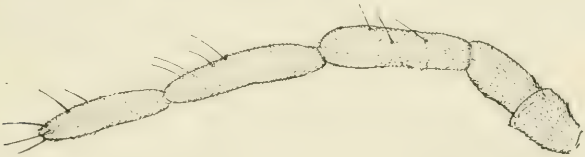

Fig. 51 Youngomyia podophyllae, palpus of male (enlarged, original)

Youngomyia rubida Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 399

The dark red male was taken June 29, 1906 on sedge, Carex, at Nassau, N. Y.

Male. Length 2 mm. Antennae twice the length of the body, thickly haired, light brown, yellowish basally; 14 segments, the fifth trinodose, with the two longer stems each with a length twice their diameters; terminal segment, basal portion of the stem much produced, the middle enlargement slightly prolonged and well separated from the distal enlargement, which latter is obpyriform and apically bears a long, fusiform appendage. Palpi; the penultimate segment long, stout, tapering at both extremities, the terminal one a little longer, more slender. Face pale yellowish. Mesonotum dark brown, the submedian lines narrow, yellow, sparsely setose. Scutellum pale yellow, sparsely setose, postscutellum and abdomen dark brown, the basal segment slightly darker. Genitalia pale yellowish, dark brown distally. Wings hyaline, costa light brown. Halteres pale yellowish basally, slightly fuscous apically. Legs yellowish brown; claws long, stout, strongly curved basally, slightly so apically. Genitalia; basal clasp segment short, stout, a long, narrowly triangular lobe basally; terminal clasp segment long, swollen basally; dorsal plate broad, triangularly incised, the lobes slender, narrowly rounded; ventral plate broad at base, tapering, broadly rounded. Type Cecid. 423. (See plate 7, fig. 1, plate 12, fig. 2)

Youngomyia pennsylvanica Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20:106–7

The midge was taken by Dr W. G. Dietz, Hazelton, Pa.

Youngomyia vernoniae Felt

1911 **Felt, E. P.** Econom. Ent. Jour., 4:552

This striking form was reared June 2, 1886 from blossoms of Vernonia noveboracensis collected in Virginia September 23, 1885. The material was kindly loaned for study by the United States National Museum. The yellowish brown male may be separated from allied forms by the basal portion of the stem of the fifth antennal segment being shorter than the distal part. The female has the basal portion of the fifth antennal segment at least moderately prolonged. Inostemma horni Ashm. and Trichacis rubicola Ashm. MS. (Insect Life, 4:124, 125) were with little question reared from this midge.

Gall. There appears to be no description aside from the mere statement that the specimen was reared from the blossoms, presumably aborted as in Sambucus infested by Y. umbellicola O. S.

Youngomyia quercina Felt

1911 **Felt, E. P.** Econom. Ent. Jour., 4:551–52

The midge was reared by Mr Pergande June 4, 1886 from globular leaf galls on the running oak, Quercus pumila, collected by Mr Koebele at Donner, Cal., September 9, 1885, and kindly loaned for study by the United States National Museum. The yellowish brown male may be separated from its allies by the structure of the antennae and genitalia.

Gall. Diameter 4 mm, globular or subglobose and on the under side of the leaf. The two specimens available were both at the end of one small leaf.

Youngomyia umbellicola O. S.

1871 **Osten Sacken, R.** Amer. Ent. Soc. Trans., 3:52 (gall and larva described, Cecidomyia)

1876 **Bergenstamm, J. E. & Low, Paul.** Verh. k. k. zool.-bot. Gesell. Wien., 26:91 (Cecidomyia)

1892 **Beutenmueller, William.** Amer. Mus. of Nat. Hist. Bul., 4:269 (Cecidomyia)

1907 ———— Amer. Mus. of Nat. Hist. Bul., 23:393 (Cecidomyia)

1910 **Stebbins, F. A.** Springf. Mus. of Nat. Hist. Bul., 2:48 (Cecidomyia)

The gall is a common, widely distributed deformity. It occurs generally in New York State and has been observed in other eastern states and recorded from both Illinois and Missouri. Adults were reared April 13, 1887 from blossoms of elder, Sambucus, taken at Cadet, Mo., April 9. The material was kindly loaned for study through the courtesy of the United States National Museum.

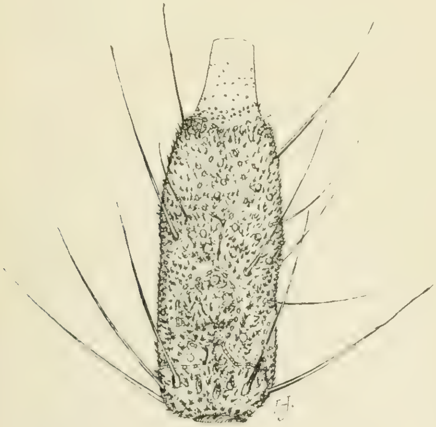

Fig. 52 Youngomyia umbellicola, fifth antennal segment of female (enlarged, original)

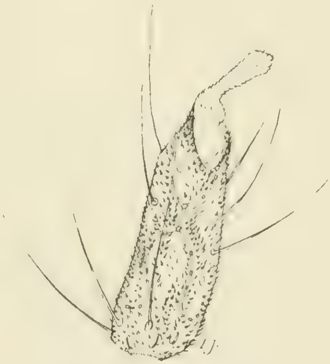

Fig. 53 Youngomyia umbellicola, terminal antennal segment of female. This is densely haired, only a few setae being shown (enlarged, original)

Gall. Diameter 4 to 6 mm, globose and conspicuous because of the larger size in comparison with the normal, smaller flowers (Plate 5, fig. 2). The gall contains one or more orange-yellow larvae.

Larva. Length 2.5 mm, pale yellowish orange, the head moderately long, broad, the antennae long, slender, the segmentation distinct; breastbone bidentate, distinctly chitinized, the shaft slender, somewhat irregular and with an expansion posteriorly; skin coarsely shagreened, the subtruncate posterior extremity with a submedian pair of well-developed, upcurved, chitinous spines resting upon a rather well-defined, chitinous plate. These spines are moved by living larvae very much as though they might be employed as prehensile organs in somewhat the same way as described for the larvae of Cecidomyia viticola O. S.

Female. Length 2 mm. Antennae as long as the body, sparsely haired, light brown; 14 segments, the fifth with a stem one-fourth the length of the cylindric basal enlargement, which latter has a length three times its diameter; terminal segment produced, the cylindric basal portion with a length five times its diameter and apically bearing a long, slender, fingerlike process. Palpi; the first segment stout, with a length one-half greater than its diameter, the second twice the length of the first, swollen distally, the third longer and more slender than the second, the fourth about as long as the third. Mesonotum light yellowish brown, the submedian lines yellowish. Scutellum and postscutellum pale yellowish. Abdomen rather sparsely clothed with long, yellowish hairs, yellowish brown; first segment yellowish basally. Wings hyaline, costa light brown; halteres whitish transparent basally, slightly fuscous apically. Legs long, slender, a light fuscous yellowish, the distal tarsal segments darker; claws stout, strongly curved, pulvilli shorter than the claws. Ovipositor short, the lobes large, roundly quadrate. Type Cecid. 875.

Youngomyia producta n. sp.

This singular form was taken at Karner, N. Y., July 5, 1906 on bush honeysuckle, Diervilla lonicera.

Female. Length 1.5 mm. Antennae as long as the body, sparsely haired, light brown; 14 segments, the fifth with a stem about one-fourth the length of the cylindric basal enlargement, which latter has a length four times its diameter; terminal segment produced, cylindric, with a length five times its diameter and apically a long, fingerlike process swollen basally and separated from the preceding by a distinct constriction. Palpi; first segment roundly subquadrate, the second with a length about two and one-half times its diameter, the third and fourth subequal, each nearly as long as the second. Face fuscous yellowish. Mesonotum dark brown, the submedian lines yellowish. Scutellum deep orange, sparsely setose apically; postscutellum light orange. Abdomen yellowish orange. Wings hyaline, costa light brown; halteres yellowish basally, fuscous transparent apically. Legs light brown; claws long, stout, evenly curved, the pulvilli about half the length of the claws. Ovipositor short, the lobes large, broadly oval, almost circular. Type Cecid. 474. (See plate 7, fig. 3)

THOMASIA Rübs.

1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:288; 16:168

1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:53

1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 236

The claws are all toothed, the teeth standing out prominently, the pulvilli nearly as long as the claws. The dorsal plate is short, the lobes stout, broadly rounded, almost truncate, the ventral plate short, triangularly emarginate, the lobes narrowly rounded. The ovipositor is greatly produced.

Type Clinodiplosis oculiperda Rübs.

Thomasia californica Felt

1914 **Felt, E. P.** N. Y. Ent. Soc. Jour., 22:132

The female, tentatively referred to this genus, was reared August 27, 1913 from galls on Symphoricarpos collected by Prof. E. Bethel at Lake Tahoe, California. The gall consists of irregularly thickened, partly unfolded opposite leaflets, the swelling being confined mostly to the basal half of the midrib. A detailed description of the female is given in the above citation.

DICRODIPLOSIS Kieff.

1895 **Kieffer, J. J.** Soc. Ent. Fr. Bul., 64:194
1896 ———— Wein. Ent. Zeit., 15:92
1897 ———— Synopse d. Cecidomyies d'Europe et d'Algerie, p. 28
1904 ———— Soc. Scien. Brux. Ann., v. 28, pt 2; separate, p. 18
1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 394
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:288
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:53
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 157

We have placed in this genus for the present those Diplosids having all the claws unidentate and the whorls of setae, and the loops of the three circumfili in the male, symmetrical or nearly so. It is possible that some or all the forms placed here are not cogeneric with the type, D. fasciata Kieff., a point which can hardly be established without more extended knowledge than is at present available respecting the life histories of the forms under consideration.

Key to Species

Males

a Abdomen fuscous yellowish, length 1.25 mm
    b Fifth antennal segment having the stems with a length three and one-half and four and one-half times their diameters, respectively. Reared from a subglobular leaf gall on poplar.................... populi Felt, C. a1743
    bb Fifth antennal segment having the stems with a length two and one-half and three and one-half times their diameter; probably reared from an oak gall......................fulva n. sp., C. a2097a
aa Abdomen reddish brown
    b Fifth antennal segment having the stems with a length two and three and one-half times their diameters, length 1.5 mm................ androgynes Felt, C. 6

bb Fifth antennal segment having the stems with a length one and one-fourth and two times their diameters. Reared from Phenacoccus.. antennata Felt, C. a2327

bbb Fifth antennal segment having the stems very short, the basal portion with a length only about one-half its diameter..........

c Distal swelling of fifth antennal segment with a length two and one-fourth times its diameter, the distal portion of the stem with a length equal its diameter, the fourth palpal segment one-fourth longer than the third, somewhat dilated......... californica Felt, C. 1312

cc Distal enlargement of the fifth antennal segment with a length only one-half greater than its diameter, the distal portion of the stem with a length one-half greater than its diameter, fourth palpal segment one-half longer than the third............... helena Felt, C. a2210

Females

a Length 1 mm. Abdomen dull yellowish, the fifth antennal segment with a stem one-fourth the length of the subcylindric basal enlargement, which latter has a length twice its diameter...annulata Felt, C. 514

aa Length 1.25 mm. Abdomen fuscous yellowish, fifth antennal segment with a stem three-fourths the length of the basal enlargement, which latter has a length two and one-half times its diameter............... longicornis n. sp., C. 534

aaa Length 1.5 mm. Abdomen dark carmine, fifth antennal segment with a stem one-half the length of the basal enlargement, which latter has a length twice its diameter...................borealis Felt, C. 159

aaaa Length about 2 mm, fifth antennal segment with a stem one-fourth the length of the cylindric basal enlargement

b Abdomen reddish brown, the basal enlargement of the fifth antennal segment with a length three times its diameter; terminal antennal segment with a long, slender process apically.................... rubida n. sp., C. 565

bb Abdomen reddish salmon, the basal enlargement of the fifth antennal segment with a length three times its diameter; terminal antennal segment with a short, stout process apically. Reared from a bud gall on Pinus scopulorum.....gillettei Felt, C. a2205

bbb Abdomen dark brown, the basal enlargement of the fifth antennal segment with a length one-half greater than its diameter. Presumably reared from a scale insect...coccidarum Felt, C. 970

aaaaa Length about 2 mm, fifth antennal segment with a stem three-fourths the length of the cylindric basal enlargement

b Abdomen fuscous yellowish, the basal enlargement of the fifth antennal segment with a length three times its diameter. Presumably predaceous.............................venitalis Felt, C. a1128

Dicrodiplosis populi Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 394

A single male was reared, presumably from a subglobular, reddish brown leaf gall on poplar, Populus tremuloides, taken by the late Mr L. H. Joutel at Newfoundland, N. J., the midge issuing September 14, 1907.

Male. Length 1.25 mm. Antennae one-fourth longer than the body, sparsely haired, yellowish; 14 segments, the fifth with stems three and one-half and four and one-half times their diameters respectively; terminal segment produced, the distal enlargement with a length three times its diameter and with a rather long, stout, apical process. Palpi; first segment irregular, the second with a length four times its diameter, the third nearly as long as the second, the fourth one-third longer than the second. Face pale fuscous. Mesonotum yellowish, the submedian lines narrow, yellowish. Scutellum and postscutellum yellowish, the abdomen fuscous yelowish, the membrane and pleurae yellowish. Costa fuscous straw, the third vein well beyond the apex. Halteres yellowish, tinged with red. Coxae and femora basally yellowish, the distal portion of femora and tibiae somewhat fuscous, the tarsi yellowish; claws slender, evenly curved, the pulvilli about half the length of the claws. Genitalia; basal clasp segment long, stout; terminal clasp segment short; dorsal plate short, broad, narrowly and triangularly emarginate; the lobes broad, roundly emarginate, the lateral angles produced; ventral plate long, broad, broadly and roundly emarginate. Type Cecid. a1743.

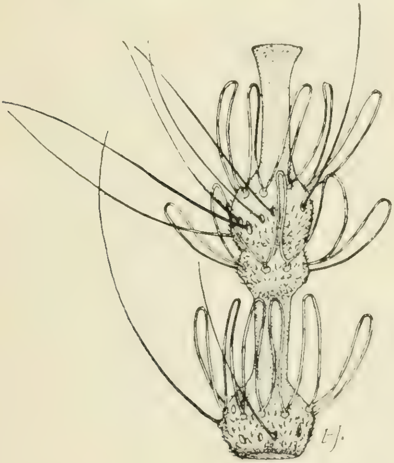

Fig. 54 Dicrodiplosis populi, fifth antennal segment of male (enlarged, original)

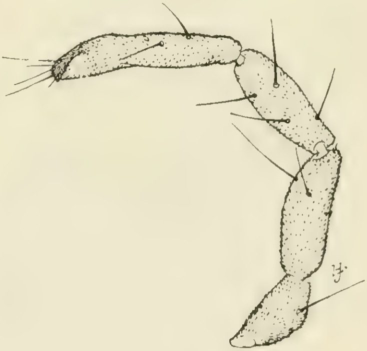

Fig. 55 Dicrodiplosis populi, palpus of male (enlarged, original)

Dicrodiplosis fulva n. sp.

The male was reared May 9, 1911 from numerous leaf galls on Quercus alba collected by the late Miss Cora H. Clarke at the Arnold arboretum, Jamaica Plain, Mass., October 31, 1911 and provisionally identified as Neuroterus umbilicatus Bass. These galls produced numerous specimens of a Neuroterus, though they are considerably larger than the galls generally recognized as those of this species. It is possible that this male represents the Cecidomyiid larva described by Osten Sacken under the name of Cecidomyia poculum.

Male. Length 1.5 mm. Antennae one-fourth longer than the body, thickly haired, fuscous yellowish; 14 segments, the fifth with stems two and one-half and three and one-half times their diameters respectively; terminal segment produced, the basal portion of the stem with a length fully five times its diameter, the distal enlargement cylindric, with a length about two and one-half times its diameter and apically with a long, fingerlike process. Palpi; first segment irregularly subquadrate, somewhat swollen distally, second segment one-half longer than the first, narrowly elliptical, the third segment a little longer and more slender than the second, the fourth about one-fourth longer than the third, dilated apically. Mesonotum reddish brown, the submedian lines sparsely haired. Scutellum fuscous orange, postscutellum yellowish. Abdomen sparsely haired, fuscous yellowish, the pleurae darker. Genitalia fuscous yellowish. Wings hyaline, costa light straw, the third vein uniting with the margin well beyond the apex of the wing. Halteres whitish basally, fuscous apically, the legs mostly a nearly uniform fuscous straw; claws long, strongly curved, the pulvilli about one-half the length of the claws. Genitalia; basal clasp segment long, moderately stout; terminal clasp segment long; dorsal plate long, triangularly incised, the lobes obliquely truncate; ventral plate long, broad, tapering, deeply and roundly emarginate, the lobes stout. Type Cecid. a2097a.

Dicrodiplosis androgynes Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 394

This reddish brown species, with a length of about 1.5 mm, was taken on white pine, Pinus strobus, at Albany, N. Y., April 28, 1906.

Description. *Hermaphrodite.* Length 1.5 mm. Antennae longer than the body, thickly haired, light brown; 14 segments, the fifth with stems two and three and one-half times their diameters respectively; terminal segment having the distal enlargement with a length nearly twice its diameter and the apex short, stout, subacute. Palpi; first segment subquadrate, the second twice the length of the first, the third as long as the second, the fourth one-half longer than the third, the basal portion strongly constricted. Head and mesonotum dark brown, the latter grayish blue. Abdomen reddish, with variable, irregular, black, median spots on the anterior segments. Costa dark brown, the third vein just beyond the apex. Halteres yellowish transparent, slightly fuscous apically. Legs yellowish transparent, the apex of tibiae and tarsi darker; claws stout, strongly curved; ovipositor one-half the length of the body, the terminal lobes long, slightly constricted at the basal third, broadly rounded. Type Cecid. 6.

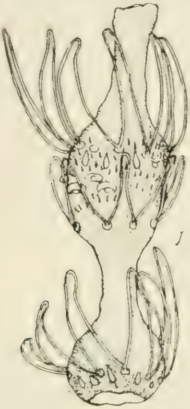

Fig. 56 Dicrodiplosis androgynes, seventh antennal segment of male (enlarged, original)

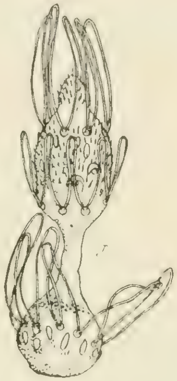

Fig. 57 Dicrodiplosis androgynes, terminal antennal segment (enlarged, original)

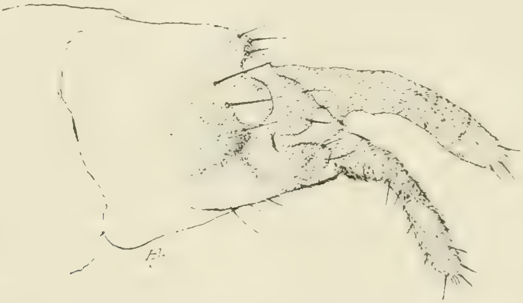

Fig. 58 Dicrodiplosis androgynes, tip of abdomen of female (enlarged, original)

Dicrodiplosis californica Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20:244–45
1914 ——— Econom. Ent. Jour., 7:458

This midge was reared from a Pseudococcus species occurring on Solanum and collected at Riverside, Cal., by P. H. Timberlake.

Dicrodiplosis antennata Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20:243-44
1914 ——— Econom. Ent. Jour., 7:458

This species was reared by Dr O. A. Johannsen, Orono, Maine, from reddish orange larvae preying on the false maple scale, Phenacoccus acericola King.

Dicrodiplosis helena Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20:245

The midge was reared from subglobular galls on the underside of Aspen leaves, Populus tremuloides, collected by Miss Cora H. Clarke at Magnolia, Mass. It is by no means certain that in this species we have the gall maker.

Dicrodiplosis annulata Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 113; separate, p. 17 (Rhabdophaga)

This dull yellowish species was swept from goldenrod and aster at Albany, N. Y., July 6, 1906.

Female. Length 1 mm. Antennae shorter than the body, thickly haired, dark brown, yellowish basally; 14 segments, the fifth with a stem one-fourth the length of the cylindric basal enlargement, which latter has a length twice its diameter. Palpi; first segment short, stout, the second twice the length of the first, narrowly oval, the third one-half longer than the second, the fifth a little longer than the third. Mesonotum dark brown, the submedian lines yellowish. Scutellum dark brown, fuscous apically, postscutellum yellowish. Abdomen dull yellowish, the basal segments fuscous dorsally; ovipositor pale orange. Costa light brown. Halteres yellowish basally, pale orange distally. Coxae and femora basally pale orange, the distal portion of femora fuscous; tibiae pale straw, tinged with carmine; tarsi light brown; claws slender, evenly curved; ovipositor short, the lobes sublanceolate, acute. Type Cecid. 514.

Dicrodiplosis longicornis n. sp.

This midge was taken in a trap lantern at Nassau, N. Y., July 9, 1906.

Female. Length 1.25 mm. Antennae nearly as long as the body, thickly haired, dark brown, yellowish basally; 14 segments, the fifth with a stem three-fourths the length of the cylindric basal enlargement, which latter has a length two and one-half times its diameter. Palpi; first segment subquadrate, the second nearly twice the length of the first, the third and fourth, each longer than the preceding, subequal. Mesonotum light fuscous yellowish, the posterior median area and submedian lines yellowish. Scutellum and postscutellum fuscous yellowish. Abdomen fuscous yellowish, the dorsal sclerites well separated, dark yellowish. Ovipositor yellowish orange. Wings narrow, costa light brown. Halteres pale yellowish, fuscous apically. Coxae yellowish; femora and tibiae fuscous straw, tarsi pale yellowish straw, the distal segments tinged with carmine; claws long, strongly curved, the pulvilli about half the length of the claws. Ovipositor about one-half the length of the abdomen, the terminal lobes narrowly lanceolate. Type Cecid. 534.

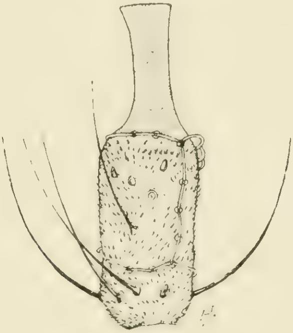

Fig. 59 Dicrodiplosis longicornis, fifth antennal segment of female (enlarged, original)

Dicrodiplosis borealis Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 113-14; separate, p. 17 (Rhabdophaga)

This dark carmine species was taken on spruce, Picea, at Lake Clear, N. Y., June 7, 1906.

Female. Length 1.5 mm. Antennae nearly as long as the body, sparsely haired, light brown, the fifth antennal segment with a stem one-half the length of the cylindric basal enlargement, which latter has a length twice its diameter. Palpi; first segment short, stout, the second rectangular, the third as long as the second, more slender, the fourth one-fourth longer than the third. Mesonotum dark brown, the posterior median area and submedian lines yellowish, the latter sparsely haired. Scutellum yellowish. Abdomen dark carmine. Costa dark brown. Halteres whitish transparent. Legs a nearly uniform pale brown, the tarsi darker; claws slender, curved. Ovipositor short, the lobes subtriangular. Type Cecid. 159.

Dicrodiplosis rubida n. sp.

This reddish brown midge was taken on elder, Sambucus, at Albany, N. Y., July 16, 1906.

Female. Length 2 mm. Antennae extending to the fourth abdominal segment, sparsely haired, light brown; 14 segments, the fifth with a stem one-fourth the length of the cylindric basal enlargement, which latter has a length thrice its diameter. Palpi; first segment short, the second with a length three times its diameter, the third longer, more slender, the fourth one-half longer than the third. Face fuscous brown. Mesonotum dark brown, the submedian lines sparsely haired, indistinct. Scutellum dark orange, postscutellum fuscous yellowish. Abdomen yellowish brown, the incisures and pleurae pale orange. Ovipositor light yellowish. Costa light brown. Halteres semitransparent, reddish apically. Legs a nearly uniform light brown; claws slender, strongly curved, the pulvilli as long as the claws. Ovipositor short, the lobes narrowly lanceolate. Type Cecid. 565.

Dicrodiplosis gillettei Felt

1911 **Felt, E. P.** Econom. Ent. Jour., 4:549

The midge was reared September 11, 1911 from an apical budlike deformity on Pinus scopulorum collected the preceding July by Prof. C. P. Gillette of Fort Collins, Col. Similar galls were also taken by Prof. E. Bethel of Denver. This species is doubtfully referred to Dicrodiplosis and appears to be closely allied to D. rubida Felt, being most easily distinguished by the color of the abdomen and the short, stout apical process of the terminal antennal segment.

Gall. Diameter 1 cm, length 1.25 cm. This is a budlike deformity covered with brownish scales and, in one instance, with rudimentary needles arising from the sides.

Dicrodiplosis coccidarum Felt

1911 **Felt, E. P.** Econom. Ent. Jour., 4:548–49
1914 ———— Econom. Ent. Jour., 7:458

The female described below was found in the collections of the United States National Museum, labeled Diplosis coccidarum, Mayaguez, Porto Rico, January 1889, August Busck. It was presumably reared from a scale insect and is with little question one of the species referred by Coquillett[1] to Diplosis coccidarum Ckll.

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[1] 1900 U. S. Nat. Mus. Proc., 22:249.

Dicrodiplosis venitalis Felt

1914 **Felt, E. P.** Insecutor Inscitiae Menstruus, 2:121–22

The female was reared in association with Lobopteromyia venae Felt from a tumid vein gall on Crataegus. The larvae are very probably predaceous.

KALODIPLOSIS Felt

1915 **Felt, E. P.** Can. Ent., 47:229–30

The unidentate, heavily toothed claws, the rudimentary pulvilli, the third vein joining the margin at or slightly before the apex of the wing, the triarticulate palpi, the heavy, rather thick and moderately short circumfili and the long dorsal and ventral plates, the latter deeply emarginate and with relatively narrow lobes, serve to distinguish this genus from Dicrodiplosis Rübs. and related series. The generic type is Dicrodiplosis multifila Felt.

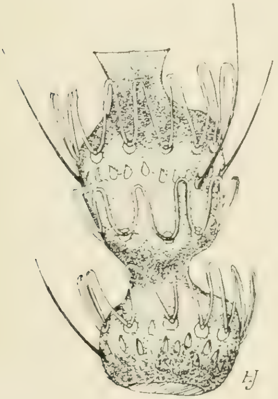

Fig. 60 Kalodiplosis multifila, fifth antennal segment of male (enlarged, original)

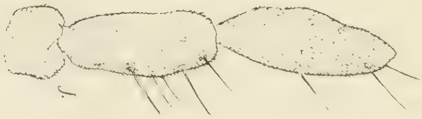

Fig. 61 Kalodiplosis multifila, palpus of male (enlarged, original)

Kalodiplosis multifila Felt

1907 **Felt, E. P.** New Species Cecidomyiidae II, p. 19–20 (Dicrodiplosis)
1908 ——— N. Y. State Mus. Bul. 124, p. 300, 394 (Dicrodiplosis)
1915 ——— Can. Ent., 47:230

The male of this species is in the United States National Museum and was collected by August Busck at Porto Rico. It is described in detail in the last of the above citations.

Kalodiplosis floridana Felt

1915 **Felt, E. P.** Can. Ent., 47:230-31

The species, detailed descriptions of which are given in the above citation, was collected August 22, 1914 on sea grape (Coccoloba) at Miami, Fla., by W. W. Yothers and forwarded by Dr Frederick Knab.

PERIDIPLOSIS n. g.

This genus may be separated from other trifili having all the claws unidentate by the triarticulate palpi, the somewhat indistinct constrictions in the flagellate antennal segments of the male, specially the almost obsolete basal portion of the stem and the distinct and characteristic lobe at the internal basal angle of the basal clasp segment. Type Cecidomyia quercina Felt.

Peridiplosis quercina Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 137; separate, p. 41 (Cecidomyia)

1908 ———— N. Y. State Mus. Bul. 124, p. 300-1, 394 (Dicrodiplosis)

This reddish brown, peculiar midge was reared March 6, 1893 at Augusta, Ga., presumably from oak.

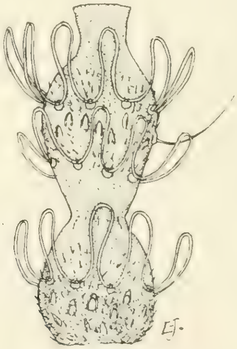

Fig. 62 Peridiplosis quercina, fifth antennal segment of male (enlarged, original)

Male. Length 1.5 mm. Antennae one-fourth longer than the body, thickly haired, light brown, 14 segments, the fifth with stems one-fourth and one-half their diameters, respectively; basal enlargement pyriform, distal enlargement narrowly oval. Circumfili moderately long and stout. Palpi; first segment short, stout, second a little longer, stouter, third with a length about two and one-half times the second. Mesonotum dark brown, submedian lines lighter, sparsely haired. Scutellum yellowish brown. Postscutellum darker. Abdomen reddish brown, the segments rather thickly margined posteriorly with brown setae, genitalia lighter. Costa light straw, subcosta greatly thickened basally, uniting with the margin before the basal half, the third vein just before the apex, the fifth at the distal fourth, its branch at the basal half. Halteres pale yellowish. Legs light yellowish straw. Claws long, slender, strongly curved, unidentate, the pulvilli as long as the claws. Genitalia; basal clasp segment long, broad and with a greatly produced, rather slender, triangular lobe at the internal basal angle, terminal clasp segment moderately long, stout; dorsal plate long, broad, deeply and narrowly incised, the lobes narrowly rounded, ventral plate long, broad and broadly rounded. Type Cecid. 1006.

LOBODIPLOSIS Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 397
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:289
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:54
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 192

The genus was erected for certain small, orange or yellowish orange forms, easily recognized by the unidentate anterior claws, the third vein uniting with costa well beyond the apex, the distinct apical lobe of the basal clasp segment and the more or less well-developed trinodose character of the flagellate antennal segments in the male. The palpi are quadriarticulate and the harpes strongly curved and heavily chitinized. The type species is Mycodiplosis acerina Felt.

Nothing is known concerning the life history of members of the species though it would not be surprising if they were zoophagous. The type species, L. acerina Felt is evidently widely distributed and persists through a considerable part of the growing season.

Key to Species

a Apical lobe of the basal clasp segment broadly rounded
  b Lobe apical, broadly rounded distally, the fifth antennal segment having stems with a length two and three times their diameters, respectively............................acerina Felt, C. 243
  bb Lobe subapical, thickly setose, the fifth antennal segment having stems with a length two and two and one-half times their diameters, respectively...........................borealis n. sp., C. 1753
aa Apical lobe of the basal clasp segment triangular
  b Apical lobe long, narrowly triangular, the fifth antennal segment having stems with a length two and two and one-half times their diameters, respectively..........triangularis n. sp., C. 1443

bb Apical lobe broad, irregularly triangular, almost quadrate, the fifth antennal segment having stems with a length two and one-half and three times their diameters, respectively (West Indian)........... spinosa Felt, C. a1956

aaa Apical lobe of the basal clasp segment slender

b Subapical lobe short, broad and distinct, the fifth antennal segment having stems with a length one and one-half and two and one-half times their diameters, respectively......speciosa Felt, C. 1454

bb No subapical lobe, the apical lobe short, stoutly spined and with sides nearly parallel; the fifth antennal segment having stems with a length two and two and one-half times their diameters, respectively.. quercina Felt, C. 271

aaaa Apical lobe of the basal clasp segment rudimentary, terminal clasp segment short, stout, fifth antennal segment having stems with a length one and one-fourth and two and one-half times their diameters respectively..................................coccidarum Felt

Lobodiplosis acerina Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 129; separate, p. 33 (Mycodiplosis)

1908 ———— N. Y. State Mus. Bul. 124, p. 398

This small, pale orange species appears to be widely distributed, since it was taken at Nassau, N. Y., June 11, 1906 on a window; at Albany, N. Y., June 15th on soft maple and chokecherry; on red cedar at Westfield, N. Y., July 11, 1906; on elder at Newport, N. Y., July 25, 1906; was captured August 17th by Prof. C. W. Johnson at Brookline, Mass., and by C. P. Alexander at Johnstown, N. Y., July 20, 1909.

Male. Length 1 mm. Antennae about as long as the body, thickly haired, light brown; 14 segments, the fifth binodose, almost trinodose, the stems two and three times their diameters, respectively; terminal segment, basal stem with a length six times its diameter, the distal enlargement cylindric, with a length three times its diameter, apically an irregular, fingerlike process. Palpi; the first segment short, stout, irregular, the second stout, with a length three times its diameter, the third a little longer and more slender, the fourth a little longer and more slender than the third. Face fuscous yellowish. Mesonotum dark brown, the submedian lines yellowish, rather thickly clothed with fuscous setae. Scutellum pale orange, postscutellum and abdomen a variable dark orange, the latter rather thickly setose. Wings hyaline, costa dark red. Halteres yellowish red basally, yellowish white apically. Coxae pale reddish brown. Legs dark brown, lighter ventrally; claws stout, strongly curved, the pulvilli about one-half the length of the claws. Genitalia; basal clasp segment long, stout, the terminal lobe broad, evenly rounded and setose apically; terminal clasp segment stout, slightly curved; dorsal plate broad, deeply incised, the lobes broadly rounded; ventral plate narrow, deeply incised, the lobes long, slender. Harpes stout, excavated basally, the distal portion prolonged as a halberdlike chitinous blade, the apex acute. Type Cecid. 243. (See plate 8, fig. 10, plate 11, fig. 2)

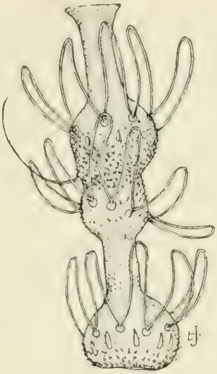

Fig. 63 Lobodiplosis acerina, fifth antennal segment of male (enlarged, original)

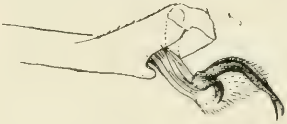

Fig. 64 Lobodiplosis acerina, side view of anterior claws of male (enlarged, original)

Lobodiplosis triangularis n. sp.

The male was taken March 7, 1913 by Owen Bryant at Greylock, Mass. It is easily distinguished from related forms by the characteristic shape of the lobe on the basal clasp segment.

Male. Length 1 mm. Antennae twice the length of the body, light brown, 14 segments, the fifth with stems having a length twice and two and one-half times their diameters, respectively. Terminal segment with a long irregular spindle-shaped appendage. Palpi; first segment short, irregular, the second nearly twice the length of the first, the third a little longer than the second, more slender, the fourth a little longer than the third. Mesonotum dark brown. Scutellum and postscutellum light yellowish brown. Abdomen dark brown, genitalia fuscous yellowish. Halteres yellowish. Legs mostly yellowish brown. Claws rather long, irregularly curved, the anterior unidentate, the pulvilli about one-half the length of the claws. Genitalia; basal clasp segment moderately long, stout and with a narrowly triangular, sparsely setose apical lobe. Terminal clasp segment rather short; dorsal plate moderately long, broad, broadly and roundly emarginate, the lobes short, broadly rounded and sparsely setose; the ventral plate long, moderately broad, triangularly emarginate, lobes short, broadly rounded. Style long. Type Cecid. 1443.

Lobodiplosis spinosa Felt

1909 **Felt, E. P.** Ent. News, 20:301–2

This remarkable species was taken at light by Prof. H. A. Ballou, government entomologist of the British West Indies at St Johns, Antigua, in January 1909. The male is easily recognized by the greatly produced genitalia, the peculiar spinose setae of the basal clasp segment and the heavy spines of the harpes.

Lobodiplosis speciosa Felt

1913 **Felt, E. P.** Psyche, 20:143–44

The species was taken by Owen Bryant in August 1917 at North Adams, Mass., and may be easily distinguished from its allies by the two subapical lobes on the basal clasp segment.

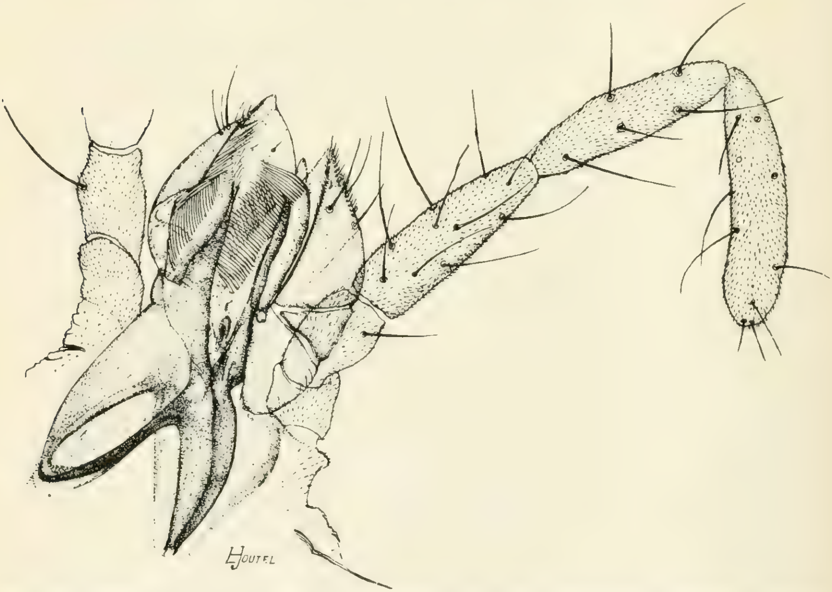

Fig. 65 Lobodiplosis quercina, mouth-parts and one palpus (enlarged, original)

Lobodiplosis quercina Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 130; separate, p. 33–34 (Mycodiplosis)

1908 ———— N. Y. State Mus. Bul. 124, p. 398

The midge was taken on white oak, Quercus alba, just above soft maple and chokecherry. This or a very closely allied form was taken in August 1907 at North Adams, Mass., by Owen Bryant.

Male. Length 1.5 mm. Antennae one-fifth longer than the body, thickly haired, light brown; 14 segments, the fifth binodose, slightly trinodose, with stems two and one-half times their diameters; terminal segment having the basal stem with a length five times its diameter, the distal enlargement cylindric, with a length three times its diameter and bearing an irregular, fingerlike process apically. Palpi quadriarticulate (Fig. 65); face pale yellowish. Mesonotum dark brown, the posterior median area and submedian lines yellowish, the last sparsely setose. Scutellum pale reddish yellow, thickly setose apically, postscutellum pale yellowish. Abdomen yellowish brown, rather thickly setose; pleurae yellowish transparent. Wings hyaline, costa light brown; halteres pale yellowish, transparent. Legs a pale brown; claws rather stout, strongly curved, the anterior unindentate, the pulvilli about half as long as the claws. Genitalia; basal clasp segment broad, with a slender spinose process apically; terminal clasp segment long, stout; dorsal plate broad, deeply and triangularly incised, the lobes narrowly rounded; ventral plate slender, broadly emarginate, the lobes short, broadly rounded. Harpes short, heavily chitinized, greatly convoluted. Type Cecid. 271. (See plate 11, fig. 1)

Lobodiplosis coccidarum Felt

1911 **Felt, E. P.** Can. Ent., 43:195–96
1914 ———— Econom. Ent. Jour., 7:458

This remarkably interesting species was reared by W. H. Patterson, St Vincent, W. I., in February 1911 from larvae preying on the eggs of Dactylopius citri. A study of other forms having similar habits and an examination of the original description of Diplosis coccidarum Ckll. convinces us that the earlier described species is very different from the one under consideration. This latter is tentatively referred to the genus Lobodiplosis because of the rudimentary lobe on the basal clasp segment, though the strongly reduced terminal clasp segment and the lack of chitinization in the harpes, so conspicuous in typical species of the genus, indicates a different line of development.

Lobodiplosis cincta n. sp.

This rather striking species was taken at Newport, N. Y., July 23, 1906 and is tentatively placed here.

Female. Length 1.5 mm. Antennae as long as the body, sparsely haired, yellowish brown; 15 segments, the fifth with a stem about three-fourths the length of the cylindric basal enlargement, which latter has a length one-half greater than its diameter and is thickly clothed with a long, stout, strongly curved setae; fourteenth segment reduced, the fifteenth long, slender, swollen basally. Palpi; first segment short, irregular, the second with a length about thrice its diameter, the third and fourth, each subequal, about one-half longer than the second, the fourth somewhat dilated. Thorax and abdomen a variable yellowish brown. Halteres yellowish. Legs mostly fuscous yellowish; the first tarsal segment, the base and the apex of the second, the apex of the third and fourth broadly white margined, the fifth white. In some specimens the basal banding of the second tarsal segment is much reduced. Claws slender, strongly curved, the anterior unidentate. Ovipositor short, stout, the terminal lobes broadly oval and thickly setose. Type Cecid. 1392.

COQUILLETTOMYIA Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 398
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:289
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:54
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 243

Members of this genus have the anterior tarsal claws unidentate and may be separated from the allied Mycodiplosis by the more or less conspicuous, setose or nearly glabrous basal lobe at the internal basal angle of the basal clasp segment. The ventral plate in the type species is as long as the style and broadly rounded apically, while the harpes are strongly chitinized. Type Mycodiplosis lobata Felt.

Key to Species

a Abdomen yellowish; internal basal lobe of the basal clasp segment short, glabrous or nearly so
  b Ventral plate slightly emarginate
    c Tarsi unicolorous, the stems of the fifth antennal segment each with a length three times their diameters; harpes fused......... lobata Felt, C. 176
    cc Tarsi broadly annulate with white, the stems of the fifth antennal segment with a length three and one-half and four and one-half times their diameters. Harpes greatly produced, recurved, free.. bryanti Felt, C. 1452
  bb Ventral plate broadly rounded
    c Fifth antennal segment having the two parts of the stem nearly equal, each with a length about two and one-half times the diameter. Harpes short, spined apically.....texana Felt, C. a1728
aa Abdomen brown; ventral plate broadly rounded
  b Abdomen light brown, the stems of the fifth antennal segment equal. Harpes long, terminating in a heavy, curved, chitinous process....... dentata Felt, C. 622
  bb Abdomen dark brown, the stems of the fifth antennal segment subequal. Harpes weakly chitinized..........................knabi Felt

Coquillettomyia lobata Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 127; separate, p. 31 Mycodiplosis)
1908 ———— N. Y. State Mus. Bul. 124, p. 398

The dark salmon male representing this genus was taken June 7, 1906 on blueberry, Vaccinium, probably V. uliginosum, at Lake Clear, N. Y. It may be separated from allied forms by the short, broad, naked, internal lobe of the basal clasp segment and the small, emarginate ventral plate.

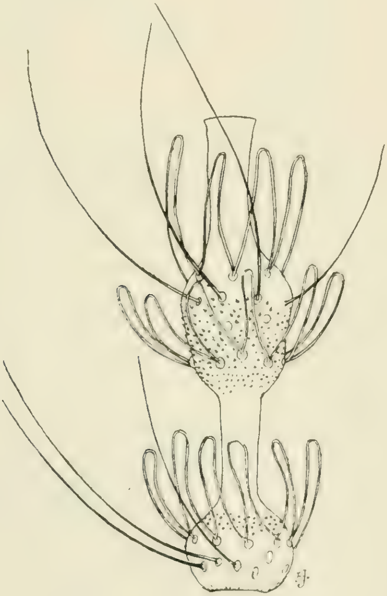

Fig. 66 Coquillettomyia lobata, fifth antennal segment of male (enlarged, original)

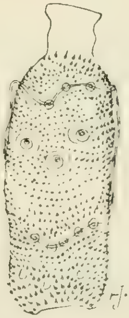

Fig. 67 Coquillettomyia lobata, fifth antennal segment of female (enlarged, original)

Male. Length 1 mm. Antennae as long as the body, thickly haired, light brown, yellowish basally; 14 segments, the fifth with stems thrice their diameters. Palpi; the first segment subquadrate, the second narrowly oval, the third a little longer than the second, more slender, the fourth longer and more slender than the third. Face yellowish. Mesonotum dark brown, the submedian lines yellowish. Scutellum yellowish, postscutellum slaty brown. Abdomen dark salmon. Wings hyaline, costa dark brown. Halteres yellowish transparent. Legs dark straw, tarsi darker; claws long, slightly curved basally. Genitalia; basal clasp segment long, stout, a subquadrate lobe at the internal basal half; terminal clasp segment stout; dorsal plate broad, deeply and triangularly incised, the lobes narrowly rounded; ventral plate long, slender, broadly and slightly emarginate. Type Cecid. 176. (See plate 10, fig. 3)

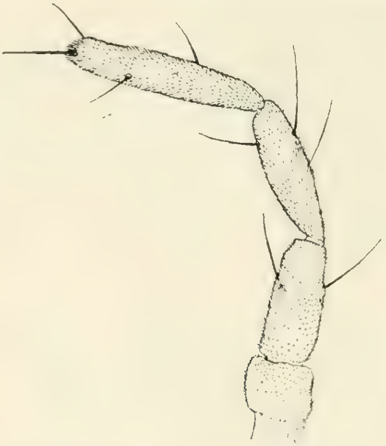

Fig. 68 Coquillettomyia lobata, male palpus (enlarged, original)

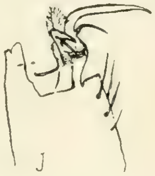

Fig. 69 Coquillettomyia lobata, side view of anterior claw of male (enlarged, original)

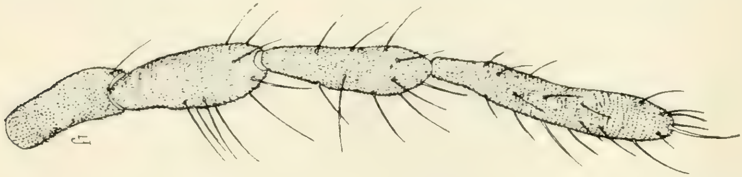

Fig. 70 Coquillettomyia lobata, palpus of female (enlarged, original)

Coquillettomyia texana Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 398

The male was reared September 3, 1907 by E. S. Tucker from a cage containing young oats, Avena sativa.

Male. Length 1.5 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems each two and one-half times their diameter; terminal segment produced, the basal portion of the stem with a length six times its diameter, the distal enlargement with a length two and one-half times its diameter and apically a long, fingerlike process. Palpi; the first segment short, stout, the second with a length three times its diameter, the third a little longer, more slender, the fourth one-half longer than the second. Mesonotum probably light brown. Scutellum, postscutellum and abdomen yellowish or yellowish brown. Wings hyaline, costa light brown. Halteres yellowish. Legs probably light straw; claws long, slender, strongly curved, the anterior unidentate, the pulvilli one-third the length of the claws. Genitalia; basal clasp segment short, stout, a conspicuous triangular lobe at the internal basal angle; terminal clasp segment long, stout; dorsal plate short, the lobes narrowly rounded; ventral plate short, stout, broadly rounded. Type Cecid. a1728.

Coquillettomyia bryanti Felt

1913 **Felt, E. P.** Psyche, 20:144

This New England species is most easily recognized by the broad, white annulations on the tarsi.

Coquillettomyia dentata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 398

The light brown male was taken July 18, 1906 on a window at Newport, N. Y., and numbers were observed hanging from cobwebs. This species was taken at North Adams, Mass., August 1907 by Owen Bryant.

Male. Length 1 mm. Antennae twice the length of the body, thickly haired, light brown; 14 segments, the fifth with stems each four times their diameters. Palpi; the first segment short, stout, the second narrowly oval, the third with a length twice the second, the fourth one-fourth longer than the third, more slender. Mesonotum light brown, the submedian lines yellowish. Scutellum light brown, yellowish apically, postscutellum and abdomen light brown. Genitalia yellowish. Wings hyaline, costa light brown. Halteres pale yellowish. Legs light brown; claws long, slender, strongly curved, the pulvilli half the length of the claws. Genitalia; basal clasp segment short, stout, a roundly triangular basal setose lobe internally; terminal clasp segment nearly as long as the basal clasp segment, slender; dorsal plate apparently wanting; ventral plate long, slender, broadly rounded. Type Cecid. 622.

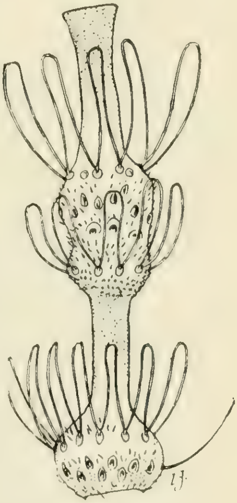

Fig. 71 Coquillettomyia dentata, fifth antennal segment of male (enlarged, original)

Coquillettomyia knabi Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20:154–55

A number of males and females of this species were taken on a spider's web at Port Limon, Costa Rica, by Frederick Knab.

Numerous females were taken in association with the males and are doubtless referable to the same species. A description of this sex is supplementary to the original account.

Female. Length 1.5 mm. Antennae a little longer than the body, sparsely haired, yellowish brown; 15 segments, the fifth with a stem about three-fourths the length of the cylindric basal enlargement, which latter has a length nearly twice its diameter and bears a thick band of stout, strongly curved setae; the fifteenth segment long, slender, swollen basally. Palpi; first segment irregular, the second subquadrate, with a length nearly three times its diameter, the third a little longer, more slender, the fourth one-half longer than the third, somewhat dilated. Ovipositor short, stout, the lobes narrowly oval and sparsely haired. Other characters nearly as in the male.

FELTIELLA Rübs.

1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:285; 16:280–81

1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:54

1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 202

This genus was erected for certain small forms with the anterio claws cleft, the pulvilli about one-half the length of the claws and with a subtriangular setose or spinose lobe at the inner angle of the basal clasp segment, much as in Lestodiplosis. The type of this genus is F. tetranychi Rübs.

We have included in this group a number of small, mostly yellowish midges easily separated from Coquillettomyia Felt by the feebly chitinized harpes and the union of the third vein with costa a little before the apex of the wing or just at its apex. These two characters also serve to distinguish the species placed in this genus from the series referable to Mycodiplosis Rübs. There are forms presenting such a combination of characters that it is difficult to draw the line between those which should be placed in this genus and others belonging in Mycodiplosis, though there is no question but that the more typical series of each genus represents a valid, generic concept. The larvae are presumably predaceous on mites and aphids.

Key to Species

a Harpes or basal lobe of the basal clasp segment setose
  b Stems of the fifth antennal segment of the male each with a length two and one-half times the diameter
    c Abdomen light fuscous yellowish, ventral plate broadly rounded.... davisi Felt, a2643
    cc Abdomen pale yellowish, ventral plate deeply and triangularly emarginate......................emarginata Felt, C. 191

bb Stems of the fifth antennal segment of the male with a length two and one-half and three and one-half times their diameters, respectively
  c Abdomen pale yellowish, ventral plate truncate or but slightly emarginate........................americana Felt, a2679
bbb Stems of the fifth antennal segment each with a length twice its diameter
  c Abdomen reddish brown, ventral plate broad, tapering, truncate... minuta Felt, C. 290
bbbb Stems of the fifth antennal segment of the male with a length one and one-fourth and one and one-half times their diameters, respectively
  c Abdomen pale yellowish, ventral plate truncate...................... venatoria Felt, a2758
aa Harpes or basal lobe of the basal clasp segment strongly spined
  b Basal portion of the stem of the fifth antennal segment with a length one-half greater than its diameter .
    c Abdomen yellowish transparent, scutellum reddish brown.......... acerifolia Felt, C. 37
    cc Abdomen dark reddish brown, scutellum pale fuscous yellowish.... pini Felt, C. 348
  bb Basal portion of the stem of the fifth antennal segment with a length twice its diameter
    c Abdomen reddish brown, scutellum yellowish..................... spinosa Felt, C. 995

Feltiella davisi Felt

1915 **Felt, E. P.** Econom. Ent. Jour., 8:406

This species was reared June 19, 1915 from catnip leaves infested with Aphis gossypii Glov. by Dr J. J. Davis of Lafayette, Ind. The larvae are with very little question predatory upon aphids. Detailed descriptions are given in the above citation.

Feltiella americana Felt

1916 **Felt, E. P.** Can. Ent., 48:33–34

A number of midges were reared July 31, 1915 by Prof. P. J. Parrott of the Agricultural Experiment Station, Geneva, from maggots apparently feeding on red mites occurring on plum foliage. Detailed descriptions are given in the above citation.

Feltiella emarginata Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 129–30; separate, p. 33 (Mycodiplosis)

1908 ———— N. Y. State Mus. Bul. 124, p. 402 (Mycodiplosis)

This pale yellow form was taken June 10, 1906 at Nassau, N. Y., and Newport, N. Y., in one instance on burdock, Arctium lappa, and also at Keene Valley September 9, 1917 by Howard Notman.

Male. Length .75 mm. Antennae fully twice as long as the body, thickly haired, pale brown; 14 segments, the fifth with stems each with a length two and one-half times their diameters; terminal segment, basal portion of stem slender, distal enlargement cylindric, with an appendage nearly as long. Palpi; the first segment subquadrate, the second twice the length of the first, stouter, the third as long as the second, more slender, the fourth one-half longer than the third, more slender; face yellowish. Mesonotum pale orange yellow. Scutellum, postscutellum and abdomen pale lemon yellow. Wings hyaline, costa pale brown, subcosta uniting with the margin at the basal fourth, the third vein curving distally, joins the margin slightly beyond the apex; halteres whitish transparent. Legs nearly uniform pale straw; claws slender, uniformly curved. Genitalia; basal clasp segment stout, at the basal third a subtriangular process; terminal clasp segment straight, swollen at the base, slender; dorsal plate broad, narrowly emarginate, the lobes obliquely and irregularly rounded; ventral plate narrow, deeply and triangularly emarginate, the lobes subtriangular, stout basally, tapering. Type Cecid. 191. (See plate 10, fig. 7)

Feltiella minuta Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 127; separate, p. 31 (Mycodiplosis)

1908 ———— N. Y. State Mus. Bul. 124, p. 400 (Mycodiplosis)

The male was taken June 14, 1906 on a window at Nassau, N. Y.

Male. Length .4 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems each twice their diameters; terminal segment, distal enlargement broadly rounded apically. Palpi; the first segment long, subquadrate, the second stouter, others missing. Mesonotum reddish brown. Scutellum fuscous yellowish. Abdomen reddish brown, the fourth and fifth segments fuscous. Genitalia pale yellowish. Wings hyaline, costa light brown. Halteres yellowish transparent. Legs pale brown; claws long, slender. Genitalia; basal clasp segment long, at the basal internal third, a rounded lobe; terminal clasp segment swollen basally; dorsal plate broad, short, broadly and roundly emarginate, the lobes broadly rounded; ventral plate broad, tapering, irregularly truncate; at the basal angles a pair of widely separated hairy lobes, possibly modified harpes; style long, slender. Type Cecid. 290.

Feltiella venatoria Felt

1917 **Felt, E. P.** N. Y. Ent. Soc. Jour., 25:195–96

This species was reared August 22, 1916 by D. K. McMillan, assistant state entomologist for northern Illinois, who stated that the larvae were very efficient destroyers of red spider, Tetranychus telarius, and other species on the leaves of elm and hollyhock. This species is easily separated from others, having the setose basal lobe or harpes, by the markedly shorter stems of the male flagellate antennal segments.

Feltiella acerifolia Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 127; separate, p. 31 (Mycodiplosis)

1908 ———— N. Y. State Mus. Bul. 124, p. 400 (Mycodiplosis)

The yellowish transparent male was taken May 17, 1906 along a hedge row composed of maple (Acer), elm (Ulmus) etc., at Albany, N. Y.

Male. Length 2.5 mm. Antennae as long as the body, thickly clothed with fine hairs, light brown, probably 14 segments, the fifth with stems each with a length one and one-half times its diameter. Mesonotum reddish brown anteriorly, yellowish posteriorly. Scutellum reddish brown, postscutellum yellowish. Abdomen yellowish transparent, except for a conspicuous black spot on the basal abdominal segment and a reddish tint ventrally at the posterior extremity. Wings hyaline, costa light brown; halteres yellowish transparent. Legs fuscous yellowish, lighter ventrally; tarsi slightly darker; claws rather slender, strongly curved. Genitalia; clasp segments long, slender; dorsal plate broad, deeply incised, the lobes broadly and irregularly rounded; ventral plate narrow, stout, broadly rounded. Harpes lobulate, strongly spined; style long, slender. Type Cecid. 37.

Feltiella pini Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 128; separate, p. 31–32 (Mycodiplosis)

1908 ———— N. Y. State Mus. Bul. 124, p. 400 (Mycodiplosis)

The dark, reddish brown species was taken June 21, 1906 on hard pine, Pinus rigida, at Albany, N. Y.

Male. Length .75 mm. Antennae one-fourth longer than the body, thickly clothed with fine hairs, light brown; 14 segments, the fifth with stems one and one-half and two and one-half times their diameters, respectively; basal antennal segment and face fuscous yellow. Mesonotum fuscous brown, submedian lines pale yellowish. Scutellum light fuscous yellowish, postscutellum darker. Abdomen dark reddish brown with a median fuscous spot on the second and third abdominal segments. Genitalia slightly reddish. Wings hyaline, costa light brown; halteres pale yellowish; club slightly fuscous distally. Legs a nearly uniform straw brown; claws rather stout, strongly curved. Genitalia; basal clasp segment slender; terminal clasp segment stout; dorsal plate small, deeply incised, the lobes broadly rounded; ventral plate narrow, irregularly truncate. Harpes foliate, spined; style extending nearly to the tip of the terminal clasp segment, apparently bituberculate. Type Cecid. 348^1. (See plate 8, fig. 5, plate 10, fig. 6)

Feltiella spinosa Felt

1911 **Felt, E. P.** Econom. Ent. Jour., 4:550–51 (Mycodiplosis)

The small, reddish brown species described in the above citation was labeled as having been reared from oaks without any indication as to locality or date. The species was received from the Bureau of Entomology, Washington, D. C., and is described through the courtesy of Doctor Howard. It is closely allied to M. acerifolia and M. pini from which it is easily separated by the longer basal portion of the fifth antennal segment in the male.

KARSCHOMYIA Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 398 (Karshomyia)
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:289
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:54
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 240

The midges referable to this genus are small, yellowish, brown-banded, allied to Lobodiplosis Felt and easily distinguished by the unique genitalia. The stout, basal clasp segment bears a broadly dilated, subfusiform terminal clasp segment. The harpes are strongly chitinized and very complex (plate 12, figure 1). The wing is shown on plate 8, figure 9. Type Mycodiplosis viburni Felt. The larvae are presumably predaceous on aphids and mites.

In the female of the type species the stem of the fifth antennal segment is one-half the length of the cylindric basal enlargement, which latter has a length about three and one-half times its diameter. The ovipositor is short, stout, with a length about one-fourth that of the abdomen, the terminal lobes tapering to a narrowly rounded, setose apex. Near the posterior ventral angles of the dorsal sclerite there is a peculiar filamentous, circular, chitinous structure with a diameter about one-half the width of the basal portion of the ovipositor.

Karschomyia viburni Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 130; separate, p. 34 (Mycodiplosis)
1908 ———— N. Y. State Mus. Bul. 124, p. 398
1914 ———— N. Y. Ent. Soc. Jour. 22: 132 (female)

The unique male was taken June 1, 1906 on the common sheep berry, Viburnum lentago, in Washington Park, Albany, N. Y. It has been collected on white pine, Pinus strobus. This species was also taken at North Adams, Mass., August 1907 by Owen Bryant and at Woodworth's lake in the Adirondacks, altitude 1540 feet, two years later by C. P. Alexander.

Male. Length 1.5 mm. Antennae nearly twice the length of the body, rather thickly clothed with brown hairs, light brown, 14 segments, the fifth with stems two and two and one-half times their diameters, respectively; terminal segment, basal enlargement subglobular, a slightly divided distal enlargement and a rudimentary terminal prolongation nearly as long, slightly constricted at its base, swollen at the basal fourth, subcylindric distally. Palpi; the first segment irregularly subquadrate, slightly expanded distally, the second elongate, oval, nearly twice the length of the first, the third a little longer and more slender, the fourth one-half longer than the third, slender. Face dark brown, mouth-parts pale yellowish; eyes very large, black. Mesonotum rather dark brown with narrow, lighter, submedian lines. Scutellum light brown, clothed with long, brownish, apical setae, postscutellum yellowish. Abdomen light

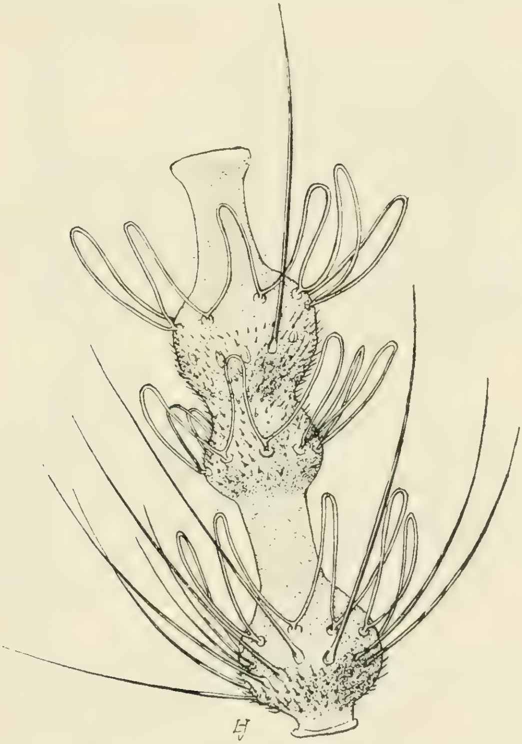

Fig. 72 Karschomyia viburni, fifth antennal segment of male (author's illustration)

yellowish with posterior margins of the segments dark brown and laterally, about the middle of each segment a short, dark brown, curved line suggesting the posterior border of a subsegment. Genitalia orange-yellow. Wings hyaline, costa light brown, subcosta uniting with the margin at the basal third, the third vein curved distally, well beyond the apex, the fifth at the distal fourth, its branch at the basal third; halteres yellowish transparent, tinged with orange basally. Legs pale straw-yellow; femora and tibiae slightly fuscous distally; tarsi light brownish apically; claws slender, strongly curved at the basal third, the anterior unidentate. Genitalia; basal clasp segment stout, at the internal angle, a thickly set group of 7 or 8 long, stout, slightly curved setae; terminal clasp segment stout, expanding distally and curving to a broadly rounded excavated apex; at the basal third a curved, broad, chitinous process, with a rounded extremity extends over the excavated internal face; dorsal plate broad, practically divided, the lobes subtriangular; ventral plate apparently absent. Harpes exceedingly complex, consisting of a broad, convolute basal portion slightly diverging distally from the median line and apically a series of long, stout, strongly curved, apparently fused teeth suggesting the segment of a hollow sphere;

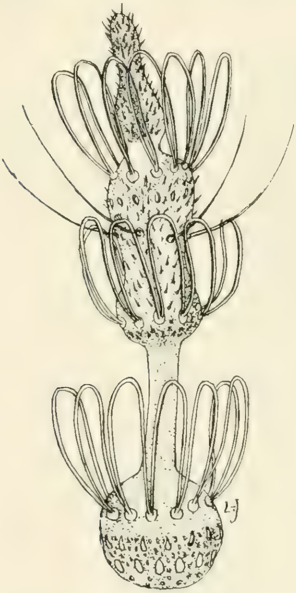

Fig. 73 Karschomyia viburni, terminal antennal segment of male (enlarged, original)

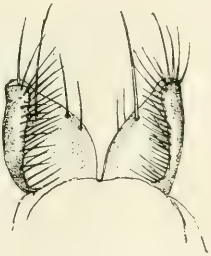

Fig. 74 Karschomyia viburni, last abdominal segment (enlarged, original)

at the internal basal half the harpes appear to be fused and produced posteriorly as a pair of slender, chitinous rods bearing two or three long prongs. Type Cecid. 89. (See plate 8, fig. 9, plate 12, fig. 1)

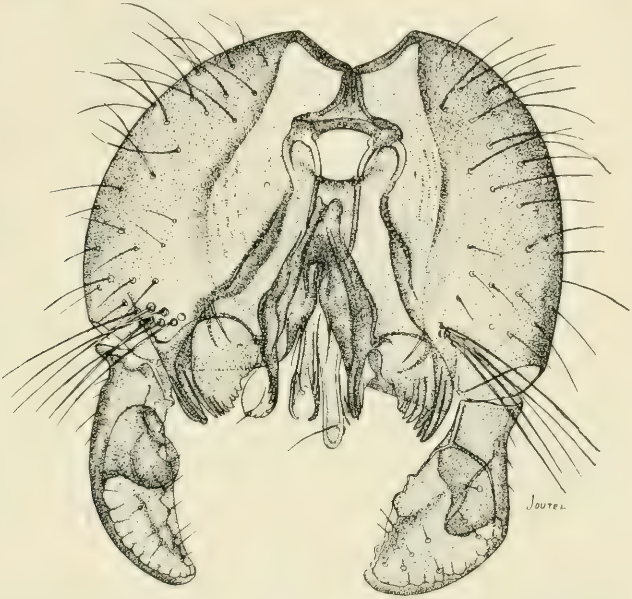

Fig. 75 Karschomyia viburni, male genitalia showing the very complex structure (enlarged, original)

Karschomyia townsendi Felt[1] is a South American form tentatively referred to this genus.

Karschomyia cocci Felt

1913	**Felt, E. P.**	Can. Ent., 45:304–5
1914	———	Econom. Ent. Jour., 7:458

This species was reared from the sugar cane mealy bug, Pseudococcus sacchari?, collected at Central Providencia, Patillis, P. R., January 30, 1913 by D. L. Van Dine.

CLINODIPLOSIS Kieff.

1894	**Kieffer, J. J.**	Feuille Juen. Natural., 24:121
1896	———	Wien. Ent. Zeit., 15:93, 96
1897	———	Syn. Cecid. de Eur. & Alg., p. 37–38
1911	**Felt, E. P.**	N. Y. Ent. Soc. Jour., 19:54
1913	**Kieffer, J. J.**	Gen. Insect., fasc. 152, p. 237

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[1] N. Y. Ent. Soc. Jour., 20:155–56. 1912.

Males of this genus, according to Kieffer, have the nodes of the flagellate antennal segments very unequal. The small, yellowish species belonging here may be recognized by the anterior unidentate claws, the quadriarticulate palpi, the lack of a conspicuous lobe or spine on the basal clasp segment, and by the linear, emarginate ventral plate. The dorsal plate is deeply incised, the lobes oblique or slanting and broadly rounded. Type C. cilicrus Kieff.

Key to Species

a Length 1 mm, fifth antennal segment of the male with stems two and three times their diameters, respectively, the dorsal plate deeply and narrowly incised, the lobes obliquely truncate, the ventral plate lobes long and slender; reared from stems of Papaver.............. caulicola Coq.

aa Length 1.5 mm, fifth antennal segment of the male with the stems two and one-half and three times their diameters, respectively, the dorsal plate deeply and triangularly incised, the lobes obliquely truncate, the lobes of the ventral plate short and broad.......... araneosa Felt, C. a2277

aaa Length 1 mm, fifth antennal segment of the male with the stems three and three and one-half times their diameters, respectively; dorsal plate deeply and triangularly incised, the lobes broadly rounded, the lobes of the ventral plate short...................... examinis Felt, C. a2411

Clinodiplosis caulicola Coq.

1895 **Coquillett, D. W.** Insect Life, 7:401–2 (Diplosis)

This insect was reared in July 1893 from the basal portion of the stems of Iceland poppies, Papavaer nudicaule, transmitted to the Federal Department of Agriculture by Mrs Celia Thaxter, Portsmouth, N. H. The larvae were rather abundant in the plant tissues.

Male. Length 1 mm. Antennae twice the length of the body, thickly haired, probably pale yellowish; 14 segments, the fifth with stems two and three times their diameters; terminal segment, basal portion of the stem with a length four times its diameter, the distal part strongly constricted near the basal and distal thirds, apically a short, stout appendage. Palpi probably quadriarticulate. Mesonotum brown, the submedian lines yellowish. Scutellum yellowish apically. Abdomen yellow. Wings hyaline, costa yellowish. Claws long, slender, evenly curved, the anterior minutely unidentate, pulvilli shorter than the claws. Genitalia; basal clasp segment short, stout; terminal clasp segment long, stout, slightly expanded distally; dorsal plate long, deeply and narrowly incised, the lobes obliquely truncate; ventral plate long, broad, broadly and roundly emarginate, the lobes slender, narrowly rounded.

Female. Length 1.5 mm. Antennae as long as the body, sparsely haired, light brown; 14 segments, the fifth having the stem about one-third the length of the cylindric basal enlargement, which latter has a length thrice its diameter and sparse subbasal and subapical whorls of stout setae; terminal segment having the basal enlargement with a length four times its diameter, apically a long appendage, swollen basally. Palpi; first segment subquadrate, the second stout, with a length three times its diameter, the third a little longer than the second, the fourth one-half longer and more slender than the third. Mesonotum light brown, the submedian lines yellowish. Scutellum and postscutellum yellowish. Abdomen pale yellowish. Ovipositor short, the lobes narrowly oval. Other characters practically as in the male.

Clinodiplosis araneosa Felt

1912 **Felt, E. P.** N. Y. Ent. Soc. Jour., 20: 154

This species attracted notice on account of its frequenting spider webs at Cabin John, Md.

Clinodiplosis examinis Felt

1913 **Felt, E. P.** Can. Ent., 45:306

Midges belonging to this species were present by hundreds if not thousands upon a screen door or hanging from cobwebs attached thereto at Nassau, June 19, 1913 and may possibly prey upon plant lice.

MYCODIPLOSIS Rübs.

1895 **Rübsaamen, E. H.** Ent. Nachricht, 21:186; genus erected
1896 **Kieffer, J. J.** Wein. Ent. Zeit., 15:92, 95
1897 ———— Synopse d. Cecidomyies d'Europe et d'Algerie, p. 28
1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 400
1910 **Rübsaamen, E. H.** Zeitsch. Wissenschaft. Insektenbiol., 15:289
1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:54
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 241

This genus was originally erected by Rübsaamen for the reception of certain adults reared from mycophagous larvae, the type being Diplosis coniophaga Winn. It may be recognized by the regular whorls of hairs and the unidentate claws on the anterior and occasionally on the mid pair of legs, those of the posterior legs being simple. The genitalia are not greatly enlarged and the ovipositor not remarkable for any peculiar structure. Examples of a species of Mycodiplosis received from Rübsaamen and reared by him from Senecio, have the anterior claws unidentate, the mid and posterior pair simple. The terminal clasp segment in the male is long, slender, the dorsal plate deeply and triangularly incised and the lobes broadly rounded apically.

The genus comprises a large number of small, yellowish or light brown forms presenting very much the same general appearance and yet differing considerably in structural characters. The third vein as a rule joins the margin of the wing beyond the apex. We have referred to this group a considerable number of forms having a more or less uniform structure and not referable to such recently erected genera as Karschomyia, Lobodiplosis, Youngomyia and Coquillettomyia, all of which are separated from this large genus by well-marked structural characters.

Key to Species

a Third vein uniting with costa well before the apex
  b Harpes indistinct, not lobelike
    c Length .75 mm, abdomen pale yellowish, the distal stem of the fifth antennal segment with a length twice its diameter, the fourth palpal segment one-fourth longer than the third................ reducta Felt, C. 479
    cc Length 1 mm, abdomen pale yellowish, the distal portion of the stem of the fifth antennal segment with a length two and one-half times its diameter, the fourth palpal segment one-half longer than the third. Reared probably from red spiders.................. insularis C. a2413
aa Third vein uniting with costa beyond the apex
  b Ventral plate long, at least two-thirds the length of the style
    c Ventral plate expanded apically, broadly and deeply emarginate
      d Dorsal plate long
        e Lobes greatly expanded distally, spatulate; abdomen yellowish, length .75 mm......angulata Felt, C. 332a
        ee Lobes long, not greatly expanded laterally, narrowly rounded apically
          f Abdomen yellowish brown, reddish brown basally, length .75 mm, the fifth antennal segment having the stems two and two and one-half times their diameters, respectively; bred from folded, thickened cherry leaves..............cerasifolia Felt, C. a1571
          ff Abdomen light yellowish, reddish basally, length 1 mm; fifth antennal segment having the stems two and one-half and four times their diameters, respectively; bred from globular leaf gall on poplar.............. populifolia Felt, C. a1514
          fff Abdomen pale yellowish, orange-tinted basally; length 1.5 mm, fifth antennal segment with the stems three and four times the length of their diameters, respectively; bred from fungus on Impatiens, Oecidium impatientis........impatientis Felt, C. a1542
      dd Dorsal plate short, broad, the lobes broadly rounded and margined with setae; ventral plate deeply and triangularly emarginate, the lobes slender, the basal portion of the stem of the fifth antennal segment with a length two and one-half times its diameter.....rotundata Felt, C. 634, 704, 564

ddd Dorsal plate with the lateral angles produced, the lobes roundly emarginate

e Basal portion of the stem of the fifth antennal segment with a length one-fourth greater than its diameter

f The lobes of the dorsal plate broadly and roundly emarginate, the antennae plainly trinodose........ holotricha Felt, C. 1104a, 1110a, a1821b

ee Basal portion of the stem of the fifth antennal segment with a length twice its diameter

f Dorsal plate lobes short and roundly emarginate; antennae not trinodose........................... corylifolia Felt, C. a1543b

eee Fifth antennal segment having the basal portion of the stem with a length three times its diameter

f The lobes of the dorsal plate broadly, not deeply emarginate

g Ventral plate deeply and triangularly emarginate, the lobes slender......tenuitas Felt, C. 306

gg Ventral plate broadly and roundly emarginate, the lobes stout

h Stems of the fifth antennal segment approximately equal, the lateral angles of the dorsal plate produced...robusta Felt, C. 1210

hh Stems of the fifth antennal segment unequal, the lateral angles of the dorsal plate not produced.........carolina Felt, C. 976

cc Ventral plate with the sides nearly parallel, apically broadly and slightly emarginate

d Fifth antennal segment having the basal portion of the stem with a length three times its diameter, the dorsal plate short, with the lateral angles narrowly produced, the lobes roundly emarginate......................cyanococci Felt, C. 136

dd Fifth antennal segment having the basal portion of the stem with a length equal to its diameter, the dorsal plate short, the lateral angles broadly produced....................... contracta Felt, C. 671

ccc Ventral plate tapering distally, broadly and deeply emarginate

d Terminal clasp segment as long as the basal clasp segment

e Fifth antennal segment having the basal portion of the stem with a length four times its diameter, the dorsal plate truncate...............fibulata Felt, C. 684

dd Terminal clasp segment distinctly shorter than the basal clasp segment

e Fifth antennal segment having the basal portion of the stem with a length three to four times its diameter

f Abdomen fuscous yellowish, the ventral plate narrow, the distal enlargement of the fifth antennal segment with a length two and one-half times its diameter, stout and constricted at the basal third... captiva Felt, C. 197

ff Abdomen light brown, the ventral plate broad, the fifth antennal segment having the distal enlargement with a length one-half greater than its diameter and constricted at the basal third.....................
aestiva Felt, C. 389

fff Abdomen light brown, the ventral plate narrow, the fifth antennal segment having the distal enlargement with a length one-half greater than its diameter and not constricted at the basal third..................
obscura Felt, C. 204

ee Fifth antennal segment having the basal portion of the stem with a length two and one-half times its diameter, the distal enlargement with a length three-fourths greater than its diameter, the lobes of the dorsal plate obliquely truncate; abdomen fuscous yellowish..................
variabilis Felt, C. 652

eee Fifth antennal segment having the basal portion of the stem with a length one-half greater than its diameter, the distal enlargement with a length one-fourth greater than its diameter; the lobes of the dorsal plate truncate; abdomen fuscous brown...............modesta Felt, C. 289

cccc Ventral plate broadly rounded apically

d Stems of the fifth antennal segment unequal, the basal portion with a length two and one-half times its diameter, the lateral angles of the dorsal plate produced..tsugae Felt, C. 168a

dd Stems of the fifth antennal segment nearly equal, each with a length about one-half greater than its diameter, the dorsal plate without produced lateral angles. Reared from red spider on cotton...........macgregori Felt, C. a2601

bb Ventral plate rather short, about one-half the length of the style or of the basal clasp segment, if the style is short

c Ventral plate broad, broadly and slightly emarginate

d Fifth antennal segment having the basal portion of the stem with a length three times its diameter. Reared from a yellowish fungus on rotten bark.........................
fungiperda Felt, C. 1315

dd Fifth antennal segment having the basal portion of the stem with a length twice its diameter

e Dorsal plate narrowly incised, the abdomen a mottled brown
alternata Felt, C. 209

ee Dorsal plate triangularly incised, the abdomen a reddish carmine.....................hudsoni Felt, C. 188

ddd Fifth antennal segment having the basal portion of the stem with a length one-half greater than its diameter

e Abdomen pale orange, the distal enlargement of the fifth antennal segment with a length one-fourth greater than its diameter....................coryli Felt, C. 237

ee Abdomen bright orange, the distal enlargement of the fifth antennal segment with a length twice its diameter.......
perplexa Felt, C. 554

dddd Fifth antennal segment having the basal portion of the stem with a length one-fourth greater than its diameter
  - *e* Abdomen dark brown, the distal enlargement of the fifth antennal segment strongly constricted and with a length twice its diameter ....packardi Felt C. a2917a

cc Ventral plate broadly truncate
  - *d* Dorsal plate narrowly incised, the lobes rather broad; abdomen brownish orange....................aurata Felt, C. 212
  - *dd* Dorsal plate narrowly incised, the lobes narrow and narrowly rounded; abdomen dark brown......silvana Felt, C. 255

ccc Ventral plate broadly rounded
  - *d* Basal clasp segment slender, the ventral plate moderately broad, with stout setae at the lateral angles................ acarivora Felt, C. 847
  - *dd* Basal clasp segment stout, the ventral plate broadly rounded or subtruncate and uniformly setose apically................. coccidivora Felt, C. 969

cccc Ventral plate narrowly rounded
  - *d* Basal clasp segment slender; terminal lobes of female sparsely subspinose; reared from Pulvinaria....................... pulvinariae Felt, C. a2233

Mycodiplosis reducta Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 400

The male was taken July 5, 1906 on hard pine, Pinus rigida, at Karner, N. Y.

Male. Length .75 mm. Antennae as long as the body, thickly haired, light brown, yellowish basally; 14 segments, the fifth with stems each one and one-half times their diameters; terminal segment, distal enlargement constricted at the basal third and apically with a stout knoblike appendage. Palpi; the first segment short, subquadrate, the second with a length one-half greater than its diameter, the third a little shorter than the second, more slender, the fourth one-fourth longer than the third, more slender. Face fuscous yellowish. Mesonotum dark brown, the submedian lines indistinct. Scutellum deep red, postscutellum yellowish red. Abdomen pale yellowish, the basal segments fuscous; terminal segment deep orange. Wings hyaline, costa light brown. Halteres pale yellowish. Legs dark brown; claws stout, evenly curved. Genitalia; basal clasp segment long, a broadly triangular lobe at the basal third; terminal clasp segment slender, swollen basally; dorsal plate broad, short, broadly and triangularly emarginate; ventral plate long, broad, slightly emarginate; style long, slender. Type Cecid. 479. (See plate 8, fig. 7)

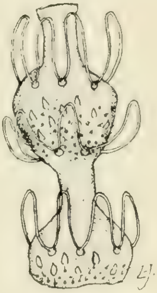

Fig. 76 Mycodiplosis reducta, fifth antennal segment of male (enlarged, original)

Mycodiplosis insularis Felt

1913 **Felt, E. P.** Can. Ent., 45:305
1914 ——— Econom. Ent. Jour., 7:458

This Porto Rican species was reared from a vial containing leaves of Leonotis nepetaefolia abundantly infested with red spider. It is allied to M. reducta Felt.

Mycodiplosis angulata Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 135 (Cecidomyia), p. 136 (C. urticae); separate, p. 39–40
1908 ——— N. Y. State Mus. Bul. 124, p. 400

The pale, yellowish male appears to be extremely common, having been taken June 19, 1906 on hickory, Carya, at Albany, N. Y., and subsequently captured on a window at Nassau, N. Y., and in a trap lantern at Poughkeepsie, N. Y.

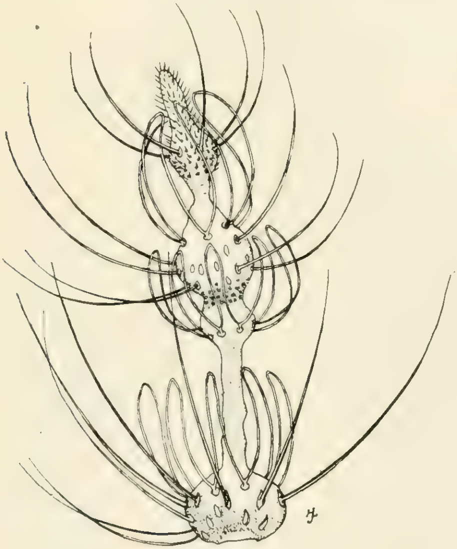

Fig. 77 Mycodiplosis angulata, terminal antennal segment of male (enlarged, original)

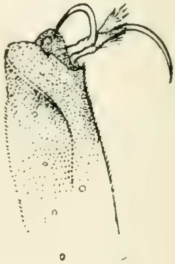

Fig. 78 Mycodiplosis angulata, side view of claw of male (enlarged, original)

Male. Length 1.25 mm. Antennae one-half longer than the body, rather thickly clothed with fine hairs, pale brown; 14 segments, the fifth with stems, each with a length three times the diameter; terminal segment, basal enlargement subglobular, the basal portion of the stem very slender, the distal enlargement prolonged, strongly constricted, the distal portion of the stem greatly swollen at its basal third, apically an elongate subconic tip. Palpi; the first segment short, stout, swollen distally, the second nearly twice the length of the first, slightly irregular, the third as long as the second, more slender, lanceolate, the fourth one-fourth longer than the third, slightly stouter, irregularly cylindric. Face pale yellowish. Mesonotum dark reddish brown with distinct submedian yellowish lines; posterior median area yellowish. Scutellum yellowish with sparse apical setae, postscutellum yellowish. Abdomen pale yellow with an irregular, reddish spot on the second and third abdominal segments. Wings hyaline, costa pale straw brown; halteres yellowish transparent basally, slightly reddish apically. Legs a nearly uniform pale fuscous straw color; claws slender, uniformly curved. Genitalia; basal clasp segment diverging at nearly right angles, deeply excavated at the distal third; terminal clasp segment slightly swollen at the base; dorsal plate broad, deeply and narrowly incised, the lobes irregularly rounded laterally, acute distally, the margin of the distal third with a series of slight elevations; ventral plate long, slender, deeply and roundly emarginate, the lobes long and narrow, obtusely rounded; style rather short, stout. Type Cecid. 332a.

Mycodiplosis cerasifolia Felt

1907 **Felt, E. P.** New Species of Cecidomyiidae II, p. 21
1908 ———— N. Y. State Mus. Bul. 124, p. 302, 400

The yellowish brown male was reared September 4, 1907 from irregularly thickened and folded chokecherry, Prunus virginiana, leaves taken by L. H. Joutel at Newfoundland, N. J.

Gall. An irregular, thickened, folded, dark-green leaf containing a number of larvae. The upper surfaces are apposed and the thickening extends most of the length of the leaf, nearly to its edge and is slightly discolored, being irregularly mottled with darker green.

Larva. Length 3 mm. Whitish, moderately stout, head small, antennae rather long, stout, uniarticulate; breastbone bidentate, the shaft subobsolescent; skin coarsely shagreened; posterior extremity deeply bilobed.

Male. Length .75 mm. Antennae twice the length of the body, thickly haired, yellowish brown, the basal segment yellowish; 14 segments, the fifth with stems two and two and one-half times their diameters, respectively; terminal segment produced, the distal enlargement broadly oval, constricted apically and bearing a rather short, stout, conical appendage. Palpi; the first segment rather stout, with a length about one-half greater than its diameter, the second a little longer, more slender, the third as long as the second, more slender, the fourth one-third longer than the third and stouter; face yellowish. Mesonotum dark brown, the submedian lines indistinct. Scutellum bright red, postscutellum a little darker. Abdomen yellowish brown, reddish brown basally. Genitalia yellowish. Wings hyaline, costa light brown; halteres yellowish orange, fuscous subapically; coxae yellowish; femora, tibiae and tarsi light straw; claws long, slender, strongly curved, the pulvilli rudimentary or wanting. Genitalia; basal clasp segment long, lobed basally; terminal clasp segment slender, somewhat swollen at the base; dorsal plate long, broad, deeply and narrowly incised, the lobes broadly rounded laterally; ventral plate long, slender, deeply and broadly incised, the lobes long, slender, subacute; style stout at base, tapering. Type Cecid. a1571.

Mycodiplosis populifolia Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 400

The male of this light yellowish species was reared September 3, 1907 from bulletlike swellings at the base of poplar leaves, Populus tremuloides, taken at Albany, N. Y.

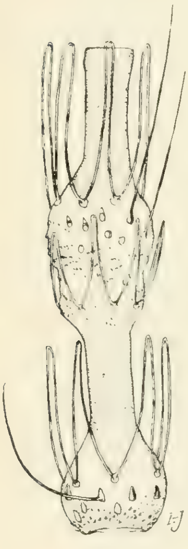

Fig. 79 Mycodiplosis populifolia, fifth antennal segment of male (enlarged, original)

Gall. 3 to 4 mm in diameter, clustered, dilated, light monothalamous swellings at the base of poplar leaves. (Plate 5, fig. 1)

Male. Length 1 mm. Antennae one-third longer than the body, rather thickly haired, pale yellowish; 14 segments, the fifth with stems two and one-half and four times their diameters; terminal segment, distal enlargement broadly oval, apically a narrow spindle-shaped appendage. Palpi; the first segment stout, with a length nearly twice its diameter, the second rather broad, with a length three times its diameter, the third shorter and more slender than the second and the fourth one-half longer and more slender than the third; face slightly fuscous. Mesonotum fuscous. Scutellum, postscutellum and abdomen light yellowish except the two basal segments of the latter, which are reddish. Wings hyaline, costa yellowish. Halteres yellowish transparent. Legs a light yellowish, the tarsi slightly fuscous; claws long, slender, evenly curved, the pulvilli about one-half the length of the claws. Genitalia; basal clasp segment long, slender, a rounded lobe at the internal basal third; terminal clasp segment long, slender; dorsal plate long, broad, deeply and narrowly incised, the lobes irregularly rounded; ventral plate slender, deeply and roundly emarginate, the emargination with a length four times its width, the lobes long, slender; style long, slender.

Female. Length 1 mm. Antennae about three-fourths the length of the body, sparsely haired, yellowish; 14 segments, the fifth with a stem about three-fourths the length of the basal enlargement, which latter has a length two and one-half times its diameter; terminal segment produced, with a length four times its diameter and a long, slender process apically. Palpi; the first segment subquadrate, with a length two and one-half times its diameter, the second twice the length of the first, the third as long as the second, more slender, the fourth a little longer than the third. Face yellowish. Mesonotum pale reddish yellow, submedian lines indistinct. Scutellum and postscutellum pale reddish yellow. Abdomen slightly fuscous; membrane and pleurae yellowish. Ovipositor short, terminal lobes slender, with a length four times the width, sparsely and coarsely setose, otherwise nearly as in the male. Type Cecid. a1514.

Mycodiplosis rotundata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 401

This small male was taken July 20, 1908 sweeping grass or sedge and bouncing bet, Saponaria officinalis, at Newport, N. Y.

Male. Length .75 mm. Antennae longer than the body, thickly haired, light straw; 14 segments, the fifth with stems three and four times their diameters. Palpi; the first segment short, stout, the second narrowly oval, the third as long as the second, slender, the the fourth one-half longer than the third, dilated. Mesonotum reddish brown. Scutellum reddish, postscutellum and abdomen yellowish brown, the fourth abdominal segment dark reddish brown. Wings hyaline, costa light brown. Halteres pale yellowish. Legs light straw, tarsi darker; claws long, slender, evenly curved, the pulvilli rudimentary, one-fourth the length of the claws. Genitalia; basal clasp segment long, stout; terminal clasp segment long, slender; dorsal plate short, broad, deeply incised, the lobes broadly rounded; ventral plate long, slender, deeply and triangularly emarginate, the lobes slender, narrowly rounded; style long, slender. Type Cecid. 634. (See plate 8, fig. 4)

Mycodiplosis impatientis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 401

The pale, yellowish orange midges were reared from larvae living exposed on a fungus, Aecidium impatientis, occurring on the stems of snapdragon, Impatiens fulva, taken at West Nyack, N. Y., June 19, 1907.

Larva. Length 1 mm, reddish, the smaller ones nearly white.

Male. Length 1.5 mm. Antennae one-half longer than the body, thickly haired, fuscous yellowish; 14 segments, the fifth with stems three and four times their diameters, respectively; terminal segment, distal enlargement somewhat produced, constricted near the basal third and with a length about twice its diameter, the terminal appendage long, greatly swollen near the basal third and tapering to a narrowly rounded apex. Palpi; the first segment short, stout, with a length about twice its diameter, the second narrowly oval, with a length about three times its diameter, the third as long as the second, more slender, the fourth longer than the third, somewhat more dilated; face fuscous. Mesonotum dark brown, the submedian lines yellowish, rather thickly haired. Scutellum and postscutellum pale yellowish. Abdomen pale yellowish, tinged with orange basally and apically, and with a conspicuous dark red, oval spot dorsally on the second and third abdominal segments. Wings hyaline, costa light brown; halteres light fuscous yellowish. Legs a nearly uniform fuscous straw; claws long, rather slender, evenly curved, the pulvilli about one-third the length of the claws. Genitalia; basal clasp segment long, slender, a triangular lobe at the internal basal third; terminal clasp segment long; dorsal plate long, broad, deeply and roundly incised, the lobes narrowly rounded; ventral plate long, slender, very deeply and roundly incised, the emargination with a length about four times its diameter, the lobes parallel, slender, subacute; style long, slender. Type Cecid. a1542.

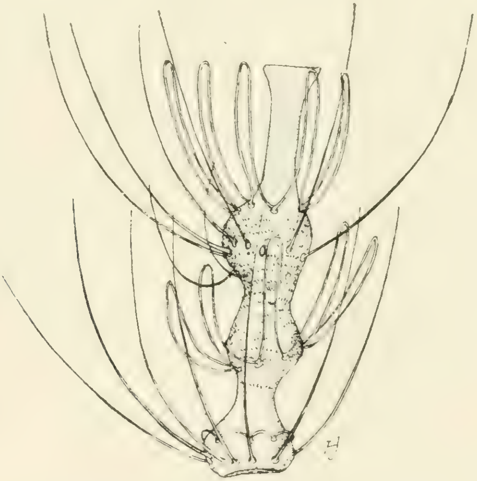

Fig. 80 Mycodiplosis holotricha, fifth antennal segment of male (enlarged, original)

Mycodiplosis holotricha Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 401

The pale yellowish male was reared at Albany in May 1908 from jars containing hickory galls and was supposed to have originated from that produced by Caryomyia holotricha O. S. The species is peculiar on account of the very short loops of the circumfili on the basal enlargement, see figure 80.

Male. Length 1.75 mm. Antennae one-third longer than the body, thickly haired, light brown, the basal segments yellowish; 14 segments, the fifth almost trinodose with stems one and one-fourth and four times their diameters, respectively; terminal segment, distal enlargement subcylindric, slightly constricted near the basal fourth, with a length about four times its diameter: apically a long, slender, fingerlike process. Palpi quadriarticulate, the first segment rather long, cylindric, with a length over twice its diameter, the second one-half longer than the first, the third one-fourth longer than the second, and the fourth a little longer than the third, each successively more slender; face yellowish transparent; thorax and abdomen pale yellowish orange, the latter slightly darker at the extremity. Genitalia fuscous yellowish. Wings with a yellowish tinge, costa light fuscous yellowish; halteres pale yellowish, light fuscous subapically. Coxae and femora basally pale yellowish, the distal portion of femora and most of tibiae yellowish straw, the tarsi mostly dark brown, the distal segments nearly black; claws long, stout, strongly curved, the pulvilli about one-third the length of the claws. Genitalia; basal clasp segment long, a broadly rounded process near the internal basal third; terminal clasp segment long, stout; dorsal plate short, broad, deeply and narrowly incised, the lobes broadly and roundly emarginate, the angles with stout setae, the lateral ones produced; ventral plate long, expanded distally, deeply and triangularly incised, the lobes short, stout, irregularly rounded; style long, stout. Type Cecid. 1104a.

Mycodiplosis corylifolia Felt

1907 **Felt, E. P.** New Species of Cecidomyiidae II, p. 20
1908 ——— N. Y. State Mus. Bul. 124, p. 301, 401

Both sexes were reared July 23, 1907 from a fuzzy, wrinkled leaf fold gall on hazel, Corylus americana, taken at West Nyack, N. Y., and produced by Lasiopteryx coryli. This species is probably zoophagous.

Male. Length 1 mm. Antennae as long as the body, thickly haired, light brown, yellowish basally; 14 segments, the fifth with stems two and three and one-half times their diameters. Palpi; the first segment short, stout, subquadrate, the second narrowly oval, the third a little longer and more slender, the fourth more slender than the third. Thorax and abdomen pale yellowish. Scutellum and base of the abdomen a little darker. Genitalia whitish transparent. Wings hyaline, costa light brown, the wings tinged with yellowish. Coxae and base of femora yellowish transparent, the distal portion of femora and tibiae pale yellowish, tarsi fuscous straw, the distal segments darker; claws long, slender, strongly curved basally, the pulvilli one-half the length of the claws. Genitalia; basal clasp segment long, slender; terminal clasp segment swollen basally, slender; dorsal plate short, broad, deeply and narrowly emarginate, the lobes broadly and roundly emarginate, the lateral and median angles produced; ventral plate long, stout, broadly and roundly emarginate, the lobes irregularly truncate; style long, stout.

Female. Length 1.75 mm. Antennae as long as the body, sparsely haired, pale straw; 14 segments, the fifth with a stem as long as the basal enlargement, which latter has a length twice its diameter; subbasal and subapical whorls thick; terminal segment, basal enlargement greatly produced, slender, the distal portion short, stout, narrowly rounded. Palpi; the first segment short, stout, subquadrate, the second with a length four times its diameter, slender, the third one-third longer than the second, more slender, the fourth a little longer and more slender than the third; thorax and abdomen a very pale lemon yellow, the dorsum of the basal abdominal segment slightly tinged with orange. Wings hyaline, costa and membrane pale yellowish; halteres yellowish transparent. Legs yellowish transparent basally, the tarsi a very pale yellowish straw. Ovipositor about one-fourth the length of the abdomen, the terminal lobes constricted at the base, slender, lanceolate, otherwise nearly as in the male. Type Cecid. a1543b.

Mycodiplosis tenuitas Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 401

The pale yellowish male was taken June 14, 1906 in a trap lantern at Poughkeepsie, N. Y.

Male. Length 1.2 mm. Antennae one-half longer than the body, rather thickly haired, straw brown; basally sooty yellowish; 14 segments, the fifth with stems three and four times their diameters, respectively. Palpi; the first segment short, stout, subglobose, the second long, subfusiform, with a length three times its diameter, the third a little longer and more slender than the second, and the fourth longer and more slender than the third; face pale yellowish. Mesonotum a nearly uniform dark brown, the submedian lines yellowish, sparsely haired. Scutellum pale sooty yellow with sparse apical setae; postscutellum and abdomen pale yellowish, the latter with the basal segment dark brown and rather thickly clothed distally with pale yellowish hairs. Wings hyaline, costa pale straw; halteres whitish transparent; coxae pale yellowish; femora dull fuscous dorsally, lighter ventrally; tibiae and tarsi mostly pale straw; claws rather long, curved at almost right angles, pulvilli nearly one-half the length of the claws. Genitalia; basal clasp segment long, stout, a broadly triangular lobe at the internal basal angle; terminal clasp segment long, slender; dorsal plate long, broad, deeply and narrowly incised, the lobes very broadly and slightly emarginate, the lateral angles each with a stout seta; ventral plate long, stout, tapering, deeply and triangularly emarginate, the lobes long, stout, narrowly rounded; style long, slender. Type Cecid. 306.

Mycodiplosis robusta Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 401

The yellowish transparent midge was captured June 11, 1907 at Albany, N. Y.

Male. Length 1.5 mm. Antennae one-half longer than the body; rather thickly haired, pale fuscous yellowish; 14 segments, the fifth with stems each two and one-half times its diameter; terminal segment produced, distal enlargement subcylindric, with a length fully three times its diameter, apically a slender, fingerlike appendage. Palpi; the first segment irregularly subquadrate, the second more than twice the length of the first, the third a little longer than the second, more slender, and the fourth about one-fourth longer than the third, more slender; face pale yellowish, the entire body a nearly uniform pale yellowish transparent. Wings hyaline, costa yellowish transparent; halteres yellowish transparent. Femora, coxae and tibiae pale yellowish, the anterior and midtarsi nearly black, the posterior tarsi fuscous yellowish; claws long, slender, strongly curved, the pulvilli about two-thirds the length of the claws. Genitalia; basal clasp segment long, slender; terminal clasp segment long, slender, slightly swollen at the base, tapering; dorsal plate short, broad, deeply and narrowly emarginate, the lobes rather broadly and roundly emarginate, the lateral angle produced, narrowly rounded; ventral plate long, stout, the sides crenulate, broadly and roundly emarginate, the lobes stout, broadly rounded; style long, stout. Type Cecid. 1210.

Mycodiplosis carolina Felt

1911 **Felt, E. P.** Econom. Ent. Jour., 4:549

The small, pale yellowish fly was reared August 8, 1895 by Mr Pergande from leaves of Lilium superbum received at the Bureau of Entomology from H. T. Kelsey, Kawani, N. C. This species appears to be closely related to M. robusta Felt.

Eggs. Length 4 mm, narrowly oval, whitish with microscopic reticulations.

Larva. The whitish or rose-colored larva, mounted as belonging to this species, has a length of 1 mm, is rather stout, the segments distinct, the head is withdrawn in the specimen and there is no evidence of a breastbone; skin coarsely shagreened; each segment bears laterally, near its posterior third, a large seta, that on the last segment perceptibly larger; posterior extremity subtruncate, slightly bilobed with rather large tubercles at the lateral posterior angles and smaller, conical tubercles mesially.

Mycodiplosis cyanococci Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 128–29; separate, p. 32
1908 ——— N. Y. State Mus. Bul. 124, p. 401

This male was taken June 4, 1906 on blueberry, Vaccinium, at Karner, N. Y.

Male. Length 1 mm. Antennae one-half longer than the body, thickly haired, light brown; 14 segments, the fifth with stems each three times their diameters. Palpi; the first segment subquadrate, the second twice the length of the first, stout, the third a little longer and more slender, the fourth one-fourth longer than the third. Face yellowish brown. Mesonotum dark brown, the submedian lines yellowish, sparsely setose. Scutellum light yellowish, margined with carmine laterally, postscutellum and abdomen dark brown. Wings hyaline, costa light straw, tinged with carmine. Halteres yellowish transparent. Legs pale straw, the femora apically and tarsi darker; claws stout, strongly curved. Genitalia; basal clasp segment long, slender; terminal clasp segment swollen basally; dorsal plate broad, deeply and narrowly emarginate, the lobes broadly and roundly emarginate; ventral plate long, narrow, slightly emarginate, the lobes broadly rounded; style long, slender. Type Cecid. 136.

Mycodiplosis contracta Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 401

The yellowish orange male was taken July 24, 1906 on white pine, Pinus strobus, at Albany, N. Y.

Male. Length .5 mm. Antennae one-half longer than the body, thickly haired, yellowish brown; 14 segments, the fifth with stems one and two times their diameters, respectively; terminal segment with the distal enlargement much prolonged, subcylindric and apically with a fusiform appendage about one-third its length. Palpi; the first segment short, subquadrate, the second one-half longer than the first, stouter, the third a little longer and more slender than the second, the fourth longer and more dilated than the third. Mesonotum light brown, submedian lines indistinct. Scutellum yellowish orange, postscutellum slightly fuscous. Abdomen a dark yellowish orange, the antepenultimate segment tinged with carmine. Genitalia yellowish. Wings hyaline, costa light brown; halteres pale yellowish; base of club slightly fuscous. Legs mostly a pale straw color; tarsi variably tinged with carmine; claws long, slender, slightly curved. Genitalia; basal clasp segment long, slender; terminal clasp segment stout, long; dorsal plate broad, deeply and narrowly incised, the lobes irregularly rounded laterally; the internal fourth obliquely truncate, the external posterior margin produced as a broadly rounded latero-posterior process; ventral plate long, slender, subtruncate; style long, slender. Type Cecid. 671. (See plate 10, fig. 4)

Mycodiplosis fibulata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 401

The pale yellowish male was taken July 23, 1906 in a trap lantern at Newport, N. Y.

Male. Length 1 mm. Antennae probably longer than the body, thickly haired, yellowish brown; 14 segments, the fifth with stems each four times the diameter. Palpi; the first segment subcylindric, with a length over twice its diameter, the second nearly twice the length of the first, rather broad, the third a little longer and more slender than the second, the fourth as long and more slender than the third. Mesonotum dark brown, the submedian lines indistinct. Scutellum light olive, postscutellum dark brown. Abdomen pale yellowish; genitalia reddish. Wings hyaline, costa light brown; halteres semitransparent, fore and mid femora fuscous, tibiae and tarsi and posterior legs light yellowish brown, the distal tarsal segments light brown; claws long, stout, curved almost at right angles, the pulvilli nearly one-third the length of the claws. Genitalia; basal clasp segment long, a broadly triangular process at the internal basal angle; terminal clasp segment as long as the basal clasp segment, slender; dorsal plate long, broad, deeply and narrowly incised, the lobes broad, truncate; ventral plate broad, tapering, deeply and triangularly incised, the lobes long, stout, subtruncate; style long, rather stout. Type Cecid. 684.

Mycodiplosis captiva Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 401

The fuscous yellowish male was taken June 10, 1906 at Nassau, N. Y.

Male. Length 1 mm. Antennae fully twice as long as the body, thickly haired, light brown, the stems whitish; 14 segments, the fifth with stems each three times its diameter. Palpi; the first segment prolonged, strongly curved, slender, the second narrowly lanceolate, the length four times its diameter, the third a little longer, more slender, the fourth one-fourth longer than the third, a little stouter; face pale yellowish. Mesonotum dark brown, submedian lines yellowish, sparsely clothed with fine hairs. Scutellum pale orange, postscutellum fuscous orange. Abdomen fuscous yellow, rather thickly clothed with yellowish hairs. Wings hyaline, costa reddish brown; halteres whitish transparent. Legs nearly uniform pale straw; claws slender, strongly curved basally. Genitalia; basal clasp segment long, slender, stout, a subtriangular lobe basally; terminal clasp segment long, slightly swollen at the base; dorsal plate broad, deeply and narrowly incised, the lobes broadly rounded; ventral plate very long, stout, tapering

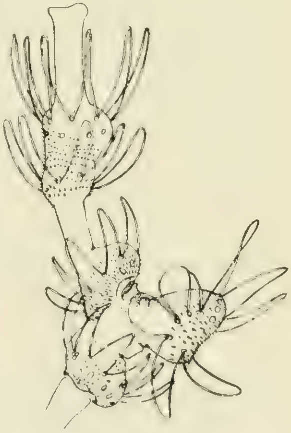

Fig. 81 Mycodiplosis captiva, fifth and sixth antennal segments of male showing a complex deformity (enlarged, original)

slightly, deeply and roundly emarginate, the lobes short, stout; style long, slender. Type Cecid. 197.

Mycodiplosis aestiva Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 402

This light-brown midge was taken June 25, 1906 in a trap lantern at Nassau, N. Y.

Male. Length 1 mm. Antennae twice as long as the body, thickly clothed with fine hairs, light brown, yellowish basally; 14 segments, the fifth with stems two and one-half and three and one-half times their diameters, respectively; terminal segment, basal portion of the stem greatly prolonged, the distal enlargement produced, subcylindric, with a slender, spindle-shaped appendage. Palpi; the first segment one-half longer than wide, narrowly rounded, irregular, the second twice the length of the first, stout, narrowly oval, the third a little longer. more slender, the fourth one-half longer than the third, more slender; face yellowish. Mesonotum dark yellowish brown, lighter posteriorly, submedian lines narrow, sparsely haired. Scutellum light reddish yellow with numerous apical setae, postscutellum light fuscous yellow. Abdomen light brown, basal segments dark reddish brown, the others yellowish basally and rather thickly clothed with yellow setae. Wings hyaline, costa light brown; halteres yellowish transparent. Legs light fuscous yellowish, tarsi light yellow, the terminal segments variably tinged with carmine; claws long, slender, strongly bent at the basal fourth. Genitalia; basal clasp segment long, slender, at the basal third a stout, angular lobe; terminal clasp segment swollen basally; dorsal plate broad, deeply and narrowly incised, the lobes obliquely truncate; ventral plate broad, long, narrowly, deeply and roundly emarginate, the lobes short; style long, slender. Type Cecid. 389.

Mycodiplosis obscura Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 402

The light-brown male was taken June 11, 1906 on sugar maple, Acer saccharum, at Albany, N. Y.

Male. Length .75 mm. Antennae about twice the length of the body, light brown, thickly haired; 14 segments, the fifth with stems two and one-half and three times their diameters, respectively. Palpi; the first segment short, stout, subcylindric, with a length about one-half greater than its diameter, the second rather long, stout, with a length fully three times its diameter, the third about as long as the second, more slender, the fourth a little longer and more slender than the third; face dark brown. Mesonotum rather dark brown, the narrow submedian yellowish lines thickly haired. Scutellum yellowish with sparse apical setae, postscutellum yellowish. Abdomen light brown, thickly clothed with fine, yellowish hairs.

Genitalia yellowish. Wings hyaline, costa light brown; halteres yellowish transparent basally, whitish apically. Legs a nearly uniform dark straw color; claws rather long, stout, curved at nearly right angles, pulvilli short, about one-third the length of the claws. Genitalia; basal clasp segment long, stout, a lobe at the internal basal angle; terminal clasp segment long, stout; dorsal plate long, broad, narrowly and triangularly emarginate, the lobes roundly truncate; ventral plate long, stout, tapering, broadly and triangularly emarginate, the lobes short, stout, subacute; style long, slender. Type Cecid. 204.

Mycodiplosis variabilis Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 402

This fuscous yellowish male was taken July 24, 1906 at Nassau, N. Y.

Male. Length 1.2 mm. Antennae one-half longer than the body, thickly haired, fuscous yellowish; 14 segments, the fifth with stems two and one-half and three times their diameters respectively; terminal segment, the distal enlargement subcylindric, with a length about three times its diameter, apically a stout, fingerlike process. Palpi; the first segment short, stout, the second narrowly oval, with a length three times its diameter, the third as long as the second, more slender, the fourth a little longer and more slender than the third. Mesonotum light brown, the submedian lines pale yellowish. Scutellum light brown, slightly darker apically, postscutellum fuscous yellowish. Abdomen sparsely clothed with coarse setae, a variable fuscous yellowish; genitalia lighter. Wings hyaline, costa light brown; halteres yellowish transparent. Legs a nearly uniform light brown, the articulations variably tinged with carmine; claws long, slender, strongly curved, the pulvilli about one-third the length of the claws. Genitalia; basal clasp segment long, slender; terminal clasp segment long, slender; dorsal plate short, broad, deeply and narrowly incised, the lobes rather broad, obliquely truncate; ventral plate broad, tapering, broadly and rather deeply emarginate, the lobes short, narrowly rounded; style long, slender. Type Cecid. 652.

Mycodiplosis modesta Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 402

The fuscous brown male was taken June 14, 1906 at Nassau, N. Y.

Male. Length .75 mm. Antennae twice as long as the body, rather thickly haired, dark brown; 14 segments, the fifth with stems one and one-half and two times their diameters, respectively. Palpi; the first segment subquadrate, irregular, the second fully twice the length of the first, rather stout, the third about as long as the second, more slender, the fourth one-third longer than the third; face dull yellowish. Mesonotum reddish brown with a small, median, oval, reddish yellow area posteriorly. Scutellum reddish yellow, postscutellum dark brown. Abdomen fuscous brown, slightly lighter distally and rather sparsely clothed with pale yellowish hairs. Wings hyaline, costa pale straw; halteres pale fuscous yellowish. Legs a nearly uniform pale yellow; claws long, slender, strongly curved basally. Genitalia; basal clasp segment long, slender, a rounded lobe at the basal third; terminal clasp segment long, slightly swollen basally; dorsal plate short, broad, deeply and narrowly incised, the lobes truncate; ventral plate broad, long, narrowly and roundly emarginate, the lobes short, broad; style stout, long, the distal fifth more slender. Type Cecid. 289.

Mycodiplosis tsugae Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 130–31; separate, p. 34
1908 ——— N. Y. State Mus. Bul. 124, p. 402

The fuscous yellowish male was taken June 7, 1906 on hemlock, Tsuga canadensis, at Lake Clear, N. Y.

Male. Length 1 mm. Antennae twice as long as the body, thickly haired, light brown; 14 segments, the fifth with stems each two and one-half times its diameter; terminal segment, distal enlargement subcylindric and with a subcylindric terminal appendage two-thirds its length, the latter constricted basally and slightly swollen at the basal fourth. Palpi; the first segment subquadrate, the second twice as long as the preceding, subfusiform, the third a little longer, much more slender, the fourth a little longer than the third, stouter; face yellowish. Mesonotum dark brown, lighter posteriorly, submedian lines yellowish. Scutellum yellowish apically, rather thickly clothed with fine hairs. Abdomen fuscous yellowish. Wings hyaline, costa brown; halteres yellowish transparent. Legs rather dark brown, the ventral surface and base of femora paler; claws rather slender, slightly curved, the anterior unidentate. Genitalia; basal clasp segment long, stout; terminal clasp segment long, swollen basally and at the distal fourth; dorsal plate broad, deeply and narrowly incised, the lobes subquadrate; ventral plate long, slender, tapering, broadly rounded; style long, slender. Type Cecid. 168a. (See plate 8, fig. 3)

Mycodiplosis macgregori Felt

1915 **Felt, E. P.** Econom. Ent. Jour., 8:149

The midge was reared July 16, 1914 by E. A. MacGregor, Batesburg, S. C., from red spider on cotton. It is allied to M. tsugae Felt.

Mycodiplosis fungiperda Felt

1915 **Felt, E. P.** Econom. Ent. Jour., 8:407

The pale yellowish, black-eyed midges referable to this species were reared by Theodore Pergande September 24, 1896 from orange-colored or whitish larvae occurring in a large, yellowish fungus growing on rotten bark. The infestation was an abundant one, the larvae occurring, according to Mr Pergande, by millions and jumping about like flies even to a distance of 5 or 6 inches.

Mycodiplosis alternata Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 126–27; separate, p. 30
1908 ———— N. Y. State Mus. Bul. 124, p. 402

The mottled brown male was taken June 11, 1906 on Mayapple, Podophyllum peltatum, at Albany, N. Y. It was swept from sugar maple, Acer saccharum, and white pine, Pinus strobus. In general color characters this species agrees very well with Diplosis maccus Loew[1] and may prove to be a synonym. The antennal coloration is also similar to that of Cecidomyia atricornis Walsh.

Male. Length 1.5 mm. Antennae probably longer than the body, thickly haired, alternately yellowish and reddish, the larger enlargement of the segments lighter, the smaller and the distal portion of the stem darker; 14 segments, the fifth with stems two and two and one-half times their diameters, respectively. Palpi; the first segment subquadrate, swollen distally, the second more than twice the length of the first, narrowly rectangular, the third a little longer, more slender, the fourth one-fourth longer than the third, slightly dilated distally; face dark brown. Mesonotum dark brown, with a narrow, median, yellowish area posteriorly, submedian lines yellowish, sparsely clothed with fine setae. Scutellum yellowish red, dark brown laterally, postscutellum dark brown. Abdomen somewhat mottled with brown, darker laterally, the segments thickly clothed with fine, yellowish hairs. Wings subhyaline, costa light brown; membrane indistinctly mottled with yellowish, there being a distinct yellowish area at the base of the wing, which extends along the anterior margin to another yellowish area at the basal third; an indistinct yellowish area at the apical third and the anterior margin and also a subapical yellowish area; there are three indistinct yellowish areas between the third vein and the fifth, the first just beyond the middle, the second near the apical fourth and the third subapically; another yellowish area lies on the posterior margin just behind the fifth vein, and one near the anal angle close to its branch; halteres and coxae yellowish transparent, femora pale yellowish with rather indistinct, brownish annulations basally and subapically; tibiae pale yellowish with more distinct fuscous annulations subbasally and apically; tarsi, the first segment yellowish fuscous; the others yellowish orange or pale orange and with distinct fuscous annulations distally, except the last segment, which is pale orange.

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[1] Loew, Hermann. Mon. Dipt. N. Am., 1:187–88. 1862.

Anterior claws long, strongly curved basally. Genitalia; basal clasp segment stout, a slight lobe basally; terminal clasp segment short, stout. Dorsal plate broad, deeply and narrowly incised, the lobes obliquely and narrowly rounded; ventral plate broad, stout, broadly rounded, the lobes broadly rounded; style long, slender. Type Cecid. 209. (See plate 8, fig. 1)

Mycodiplosis hudsoni Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 129; separate, p. 33
1908 ———— N. Y. State Mus. Bul. 124, p. 402

The reddish male was taken June 10, 1906 on red maple, Acer rubrum, at Albany, N. Y.

Male. Length 1.5 mm. Antennae about twice as long as the body, thickly haired, light brown, yellowish basally; 14 segments, the fifth with stems two and one-half and three times their diameters, respectively; terminal segment, distal enlargement prolonged, broadly constricted in the middle, bearing a short, spindle-shaped appendage. Palpi; the first segment subquadrate, the second twice the length of the preceding, the third a little longer, more slender, the fourth one-half longer than the third; face pale yellowish. Mesonotum dark reddish, the yellowish submedian lines sparsely ornamented with hairs. Scutellum and postscutellum dark reddish. Abdomen reddish carmine with indistinct fuscous markings at its base; genitalia yellowish. Wings subhyaline, costa pale straw; halteres yellowish transparent. Coxae reddish, anterior femora and tibiae dark brown, yellowish ventrally, the middle and posterior femora and tibiae nearly uniform pale yellowish, the femoro-tibial and tibio-tarsal articulations tinged with carmine, tarsi variable yellowish brown; claws long, slender, strongly curved basally. Genitalia; basal clasp segment stout; terminal clasp segment strongly curved, stout; dorsal plate short, broad, deeply incised, the lobes broadly rounded with irregular, setigerous tubercles on the posterior margin; ventral plate broad, roundly emarginate; style stout, broad. Type Cecid. 188. (See plate 8, fig. 2)

Mycodiplosis coryli Felt

1907 **Felt, E. P.** N. Y. State Mus. Bul. 110, p. 128; separate, p. 32
1908 ———— N. Y. State Mus. Bul. 124, p. 402

This pale-orange male was taken June 12, 1906 on hazel, Corylus americana, at Albany, N. Y.

Male. Length 1.5 mm. Antennae nearly as long as the body, thickly haired, light straw brown; 14 segments, the fifth with stems each one and one-half times its diameter. Palpi; first segment subquadrate, the second more than twice the length of the preceding, subrectangular, the third a little longer, more slender, the fourth one-half longer and more slender than the third; face yellowish fuscous. Mesonotum rather pale orange with a slightly dusky, broad, median stripe, the latter margined by submedian yellowish lines sparsely ornamented with pale setae. Scutellum pale orange, postscutellum slightly darker. Abdomen pale orange with the two basal segments and genitalia fuscous. Wings hyaline, costa light brown; halteres whitish transparent, anterior legs with the femora and tibiae mostly pale straw, the tarsi dark brown, the other legs mostly pale straw color, variably tinged with carmine; claws stout, strongly curved basally. Genitalia; basal clasp segment stout; terminal clasp segment short, stout, swollen basally; dorsal plate broad, deeply and triangularly incised, the lobes broadly rounded; ventral plate stout, broad, slightly emarginate; style short, stout. Type Cecid. 237. (See plate 10, fig. 5)

Mycodiplosis perplexa Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 402

The bright-orange male was taken at Albany, N. Y., July 16, 1906 on low or trailing blackberry, Rubus villosus.

Male. Length 2 mm. Antennae as long as the body, thickly haired, light brown, the basal segments fuscous yellowish; 14 segments, the fifth with stems three-fourths and two and one-half times their diameters, respectively. Palpi; first segment short, stout, broadly oval, the second rather slender, with a length nearly four times its diameter, the third a little longer and more slender than the second, the fourth as long as the third, somewhat dilated; face fuscous yellowish. Mesonotum light brown, the submedian lines rather broad, yellow. Scutellum dark reddish, postscutellum yellowish. Abdomen bright orange, the segments margined posteriorly with coarse setae. Genitalia slightly fuscous, rather thickly clothed with yellowish hairs. Wings hyaline, costa light brown; halteres pale orange basally, semitransparent apically. Coxae and basal portion of femora pale orange, the femora distally and tibiae light fuscous, the tarsi slightly darker; claws long, slender, strongly curved, the pulvilli rudimentary, about one-third the length of the claws. Genitalia; basal clasp segment long, stout; terminal clasp segment short, stout; dorsal plate long, deeply and narrowly incised, the lobes broad, tapering, narrowly rounded; ventral plate short, stout, broadly and slightly emarginate; style short, stout. Type Cecid. 554.

Mycodiplosis packardi Felt

1918 **Felt, E. P.** Econom. Ent. Jour., 11:382

The presumably predaceous larvae of this midge appear to be associated with those of the pitch inhabiting Retinodiplosis albitarsis Felt, though the condition of the material was such that the precise relation between the two could not be established.

Both of these insects were reared from exuded masses of pitch produced by Parharmonia pini Kell. and in the case of the Retinodiplosis, at least, development and transformations occurred within the pitch and the probabilities are that the same is true, though possibly to a more limited extent, of the Mycodiplosis.

Mycodiplosis aurata Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 402

The brownish orange male was taken June 11, 1906 on maple leaved arrow-wood, Viburnum acerifolium, at Albany, N. Y.

Male. Length 1.5 mm. Antennae one-half longer than the body, rather thickly haired, reddish brown; 14 segments, the fifth with stems two and two and one-half times their diameters; terminal segment produced, the basal portion of the stem with a length six times its diameter, the distal enlargement subcylindric, with a length nearly four times its diameter and bearing apically a long, rather stout, fingerlike process. Palpi; the first segment short, stout, irregularly subquadrate, the second rather stout, with a length four times its diameter, the third a little longer and more slender than the second, the fourth one-third longer and more slender than the third. Face pale yellowish brown; eyes black. Mesonotum rather dark brown, the submedian lines yellowish, sparsely haired. Scutellum and postscutellum pale orange, the former sparsely haired. Abdomen a bright orange with the basal segments and genitalia slightly fuscous and sparsely clothed with fine, reddish hairs, which latter are somewhat abundant laterally. Wings hyaline, costa light brown. Legs a nearly uniform pale straw; claws long, stout, strongly curved, the pulvilli rudimentary, about one-fourth the length of the claws. Genitalia; basal clasp segment long, stout; terminal clasp segment short, stout; dorsal plate long, deeply and narrowly incised, the lobes broad, tapering, subtruncate; ventral plate long, broad, broadly and slightly emarginate; style stout. Type Cecid. 212.

Mycodiplosis silvana Felt

1908 **Felt, E. P.** N. Y. State Mus. Bul. 124, p. 402

The dark, reddish brown male was taken June 14, 1906 on hemlock, Tsuga canadensis, at Nassau, N. Y.

Male. Length 1.6 mm. Antennae one-half longer than the body, thickly haired, light brown; basal segments yellowish; 14 segments, the fifth with stems each with a length two and one-half times its diameter; terminal segment, distal enlargement with a length about three times its diameter, strongly constricted near the basal third, apically a long, tapering, fingerlike process. Palpi; the first segment short, stout, with a length about equal to its diameter, the second rather stout, with a length about three times its diameter, the third one-half longer than the second and more slender, the fourth about as long as the third, dilated; face fuscous yellowish. Mesonotum reddish brown, the submedian lines rather thickly haired. Scutellum reddish brown, yellowish apically; postscutellum a light fuscous brown. Abdomen dark reddish brown with irregular fuscous markings dorsally and laterally on the basal segments and rather thickly clothed with fine, yellowish hairs. Genitalia fuscous yellowish. Wings hyaline, costa pale straw; halteres yellowish transparent. Coxae, femora and tibiae pale yellowish; tarsi pale yellowish, the second to fourth segments annulate with dark brown, the fifth reddish brown; claws long, stout, strongly curved, pulvilli rudimentary, one-third the length of the claws. Genitalia; basal clasp segment stout; terminal clasp segment short, stout; dorsal plate long, deeply and narrowly incised, the lobes narrow, tapering, narrowly rounded; ventral plate short, stout, subtruncate; style long, stout. Type Cecid. 255.

Mycodiplosis pulvinariae Felt

1912 **Felt, E. P.** Ent. News, 23:175–76
1914 ———— Econom. Ent. Jour., 7:458

The midges were reared from Pulvinaria pyriformis by W. H. Patterson, St Vincent, W. I.

Mycodiplosis acarivora Felt

1907 **Felt, E. P.** Ent. News, 18:242 (Cecidomyia)
1908 ———— N. Y. State Mus. Bul. 124, p. 385, 403
1914 ———— Econom. Ent. Jour., 7:458

This light-brown species, received through the courtesy of Dr L. O. Howard, bureau of entomology, United States Department of Agriculture, was reared by Frederick Maskew of southern California, from larvae feeding upon red spiders, Tetranychus mytilaspidis and T. sexmaculatus, infesting lemon leaves and fruit at Chula Vista, Cal. This species appears to be a rather common enemy of the red spider, since lots received through the courtesy of Doctor Howard show that this or a very closely allied form was reared from red spider on the Kentucky coffee tree, Gymnocladus canadensis, and from this mite on corn.

Habits. The following account transcribed from notes made by Theodore Pergande August 24, 1883 relates to a form belonging to this genus and very probably to the species under discussion.

I noticed today on some of the leaves of corn in my yard, which had a sickly appearance, large numbers of the red spiders infesting their lower side and with them were seen numerous small dipterous larvae, especially along the midrib and also several minute, white, oval cocoons belonging to them. The larvae were of all sizes, from the recently hatched ones to the fully grown. While examining them I have seen one of them with its head deeply buried in the back of a half grown mite which was still struggling with its legs. The same kind of larvae and cocoons I have often noticed on the leaves of peach trees, elder, and other plants infested with the red spider but till now have been unable to observe their mode of living, though always considering them to be an enemy of the red spider. The larva is rather slow in its movements and remains motionless for a considerable time, apparently when its hunger has been satisfied, so that often quite a number of the mites congregate around and close to it. The general color of the larva is whitish but the contents of the stomach are always of the more or less dark red color of the mites on which they feed.

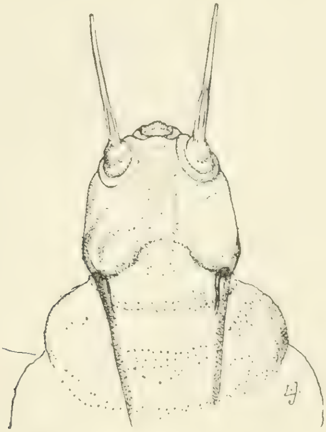

Fig. 82 Mycodiplosis acarivora, dorsal aspect of head and anterior body segments of larvae, note the unusually long antennae (enlarged, original)

Larva. Length 1.75 mm, stout, tapering anteriorly. Head large, broadly rounded, antennae slender; mouth parts inconspicuous; on the posterior portion of the head there is a pair of oblique, chitinous processes extending anteriorly towards the median line and from the base of these a longer pair of oblique, chitinous processes extend posteriorly toward the median line and terminate near the middle of the first segment; anterior spiracles conspicuous; body segments rather distinct, near the middle of each a transverse row of long, slender, conical processes, each bearing a long, stout seta; the posterior extremity obtuse, with a series of setaceous tubercles.

Mycodiplosis coccidivora Felt

1911 **Felt, E. P.** Econom. Ent. Jour., 4:549–50

The species closely resembles the Diplosis coccidarum Ckll. to which it has been referred.[1] It was reared by Prof. T. D. A. Cockerell from the ovisac of Pulvinaria urbicola taken on Capsicum at Kingston, Jamaica, W. I., and labeled in the collections of the United States National Museum as Diplosis coccidarum Ckll. See the note relating to this in the Proceedings of the Entomological Society of London, volume 41, page 161. An examination of the male shows it to be very different from what we take to be the true Diplosis coccidarum Ckll., a species reared from Dactylopius. Though the specimens were mutilated, we deemed it advisable to refer the species provisionally to this genus and characterize it, if for no other reason than to avoid further confusion. This form is allied to M. acarivora Felt, from which it is readily distinguished by the much stouter genitalia.

? **Mycodiplosis cincta** n. sp.

This strongly marked midge was taken July 11, 1909 on low vegetation near water at Johnstown, N. Y., by C. P. Alexander.

Female. Length 1.75 mm. Antennae about as long as the body, rather thickly haired, grayish black, the stems whitish; 14 segments, the fourth with a stem one-third the length of the subcylindric basal enlargement, which latter has a length three times its diameter and is slightly expanded apically. Palpi; the first segment broadly rounded, subquadrate, the second with a length fully three times its diameter, the third and fourth each one-half longer, more slender. Mesonotum, scutellum and postscutellum pale yellowish white. Abdomen deep carmine, fuscous basally, yellowish apically. Wings subhyaline, a nearly uniform light fuscous, the basal third of costa yellowish white, the third vein joining the margin well beyond the apex. Halteres whitish transparent. Coxae yellowish transparent. Legs grayish black, the distal fourth of femora, the basal two-thirds of tibiae, the first, the basal two-thirds of the second and third, and most of the fourth tarsal segments white; claws stout, strongly curved, the pulvilli about one-half the length of the claws. Ovipositor stout, nearly as long as the abdomen, the terminal lobes slender, narrowly oval. Type Cecid. 1362.

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[1] Coquillett, D. W. U. S. Nat. Mus. Proc., 22:249–50. 1900.

Mycodiplosis cucurbitae Felt

1911 **Felt, E. P.** Econom. Ent. Jour., 4:550

One female was obtained in association with Itonida cucurbitae, from which it can hardly be separated with a hand lens. It is recorded as having been reared July 10, 1876 from orange larvae on a squash, presumably by the late C. V. Riley, and was described through the courtesy of Dr L. O. Howard of the United States Bureau of Entomology. The affected squash had a curious, rough, fulvous appearance.

DIADIPLOSIS Felt

1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:54
1913 **Kieffer, J. J.** Gen. Insect., fasc. 152, p. 240

The claws not bent at right angles, the anterior unidentate and the binodose antennae of the male with three well-developed circumfili indicate a relationship with Mycodiplosis Rübs. and its allies, from which it is easily separated by the triarticulate palpi. It is readily distinguished from Xyphodiplosis Felt by the terminal clasp segment not being greatly produced and the short, broad ventral plate. Type D. cocci Felt.

Table for the Separation of the Males

a Basal portion of the stem of the fifth antennal segment with a length plainly greater than its diameter
  b Stems of the fifth antennal segment plainly unequal, having a length, respectively, one-half greater and twice the diameter; third palpal segment with a length twice that of the second; abdomen dark red; basal clasp segment greatly swollen; ventral plate broadly and roundly emarginate.................................cocci Felt, a2128
  bb Stems of the fifth antennal segment nearly equal, each with a length greater than its diameter, the abdomen yellowish
    c Stems of the fifth antennal segment with a length one-fourth greater than their diameters, the circumfili each with about eight loops, the terminal clasp segment reduced, swollen basally, the harpes with long setae...................coccidivora Felt, a2486
    cc Stems of the fifth antennal segment with a length one-half greater than their diameters, the circumfili each with 14 to 16 loops, the terminal clasp segment long, slender, not conspicuously swollen basally, the harpes inconspicuous....hirticornis Felt, a2618
aa Basal portion of the stem of the fifth antennal segment with a length equal its diameter or less; ventral plate roundly emarginate
  b Stems of the fifth antennal segment plainly unequal, with a length equal and twice their diameters, respectively; circumfili with 7 or 8 loops; third palpal segment with a length twice the second; abdomen yellowish brown; basal clasp segment constricted basally; ventral plate lobes not plainly divergent.........................smithi Felt, a2495a

bb Stems of the fifth antennal segment nearly equal, with a length one-third and one-half their diameters, respectively; circumfili with 15 loops; third palpal segment a little longer than the second; abdomen dark brown; basal clasp segment uniformly stout; ventral plate lobes divergent . . . . buscki Felt, C. 1529a

Diadiplosis cocci Felt

1911 **Felt, E. P.** N. Y. Ent. Soc. Jour., 19:55–56
1914 ———— Econom. Ent. Jour., 7:458

This species was reared by William H. Patterson, then of the Agricultural School, St Vincent, W. I., from larvae preying upon the eggs of Saissetia nigra Nietn., frequently abundant upon the stems of sea-island cotton. Type Cecid. a2128.

Diadiplosis coccidivora Felt

1914 **Felt, E. P.** Entomologist, 47:86

This midge was reared in numbers from a species of Pseudococcus by the late A. Rutherford, then government entomologist of the Department of Agriculture of Ceylon. Type Cecid. a2486.

Diadiplosis hirticornis Felt

1915 **Felt, E. P.** N. Y. Ent. Soc. Jour., 23:179

This species was reared by Harry S. Smith, then superintendent of the state insectary, Sacramento, Cal., from mealy bugs collected in Japan, and identified as Pseudococcus vaporariorum. Type a2618.

Diadiplosis smithi Felt

1915 **Felt, E. P.** N. Y. Ent. Soc. Jour., 23:178

The midges were reared by H. S. Smith when superintendent of the state insectary, Sacramento, Cal., from cocoons produced by larvae feeding upon a Pulvinaria occurring on citrus at Manila, P. I. Type Cecid. a2495a.

Diadiplosis buscki Felt

1915 **Felt, E. P.** Insecutor Inscitiae Menstruus, 2:132

This Porto Rican form was collected by August Busck and labeled Diplosis coccidarum Ckll. It had evidently been reared from some scale insect. Type Cecid. 1529a.

EXPLANATION OF PLATES

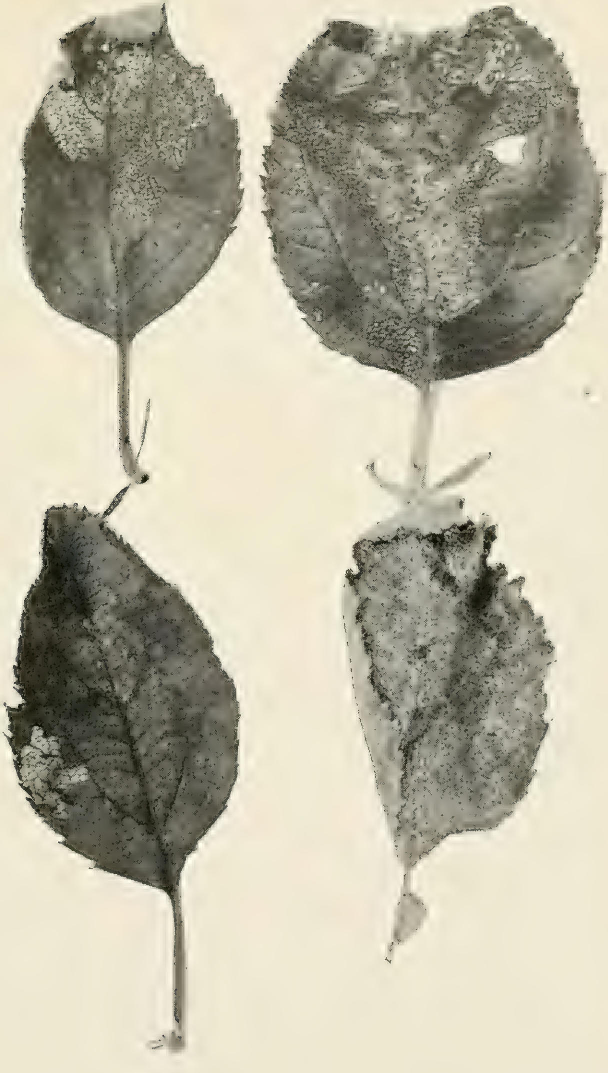
PLATE I

Apple and Thorn Skeletonizer

Hemerophila pariana Clerck

Work on apple leaves. The lower left-hand leaf shows a little feeding, the upper left-hand one a somewhat characteristic condition on moderately infested trees, the upper right-hand leaf a more advanced stage of injury and the lower right-hand leaf practically completed skeletonizing with a somewhat characteristic rolled margin. (Author's illustration from Cornell University Extension Bulletin 27)

Plate I



Apple and Thorn Skeletonizer Work

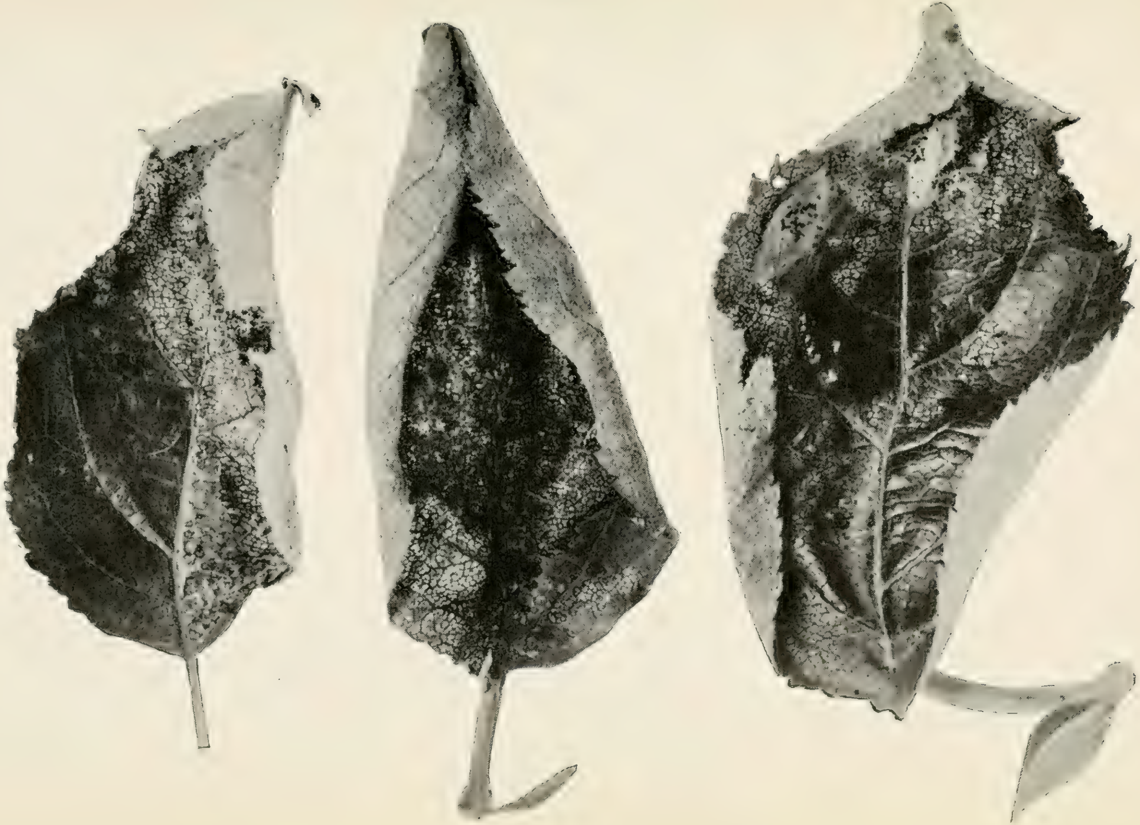
PLATE 2

Apple and Thorn Skeletonizer

Hemerophila pariana Clerck

Work on apple. The left-hand leaf shows rather serious injury and rolling on the right-hand side, the middle leaf rather general injury and rolling on both sides and the right-hand leaf less marked injury with some rolling and two cocoons near the tip of the leaf. (Author's illustration from Cornell University Extension Bulletin 27)

Plate 2



Apple and Thorn Skeletonizer Work

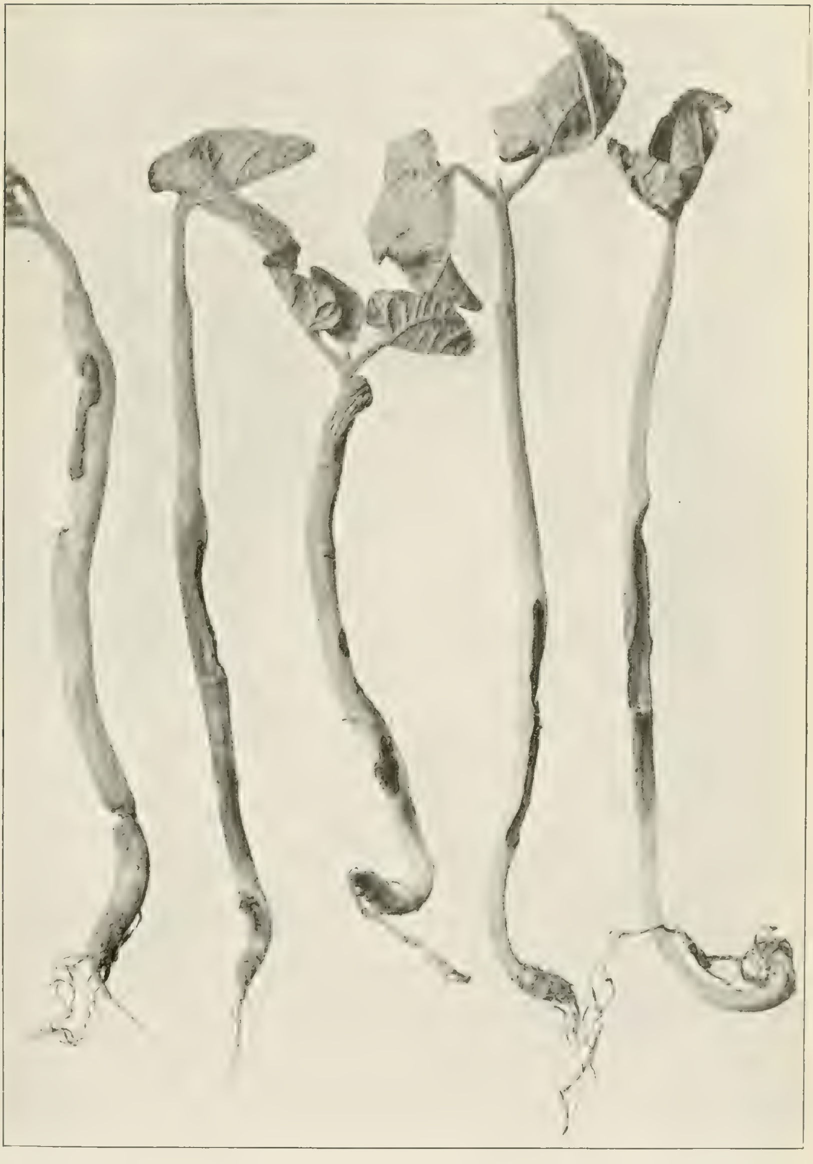
PLATE 3

Seed Corn Maggot

Pegomyia fusciceps Zett.

Bean plants showing the long, irregular gnawed areas or "burrows" of the seed corn maggot. This injury checks growth and if serious may result in a total loss of the crop. (Original)

Plate 3

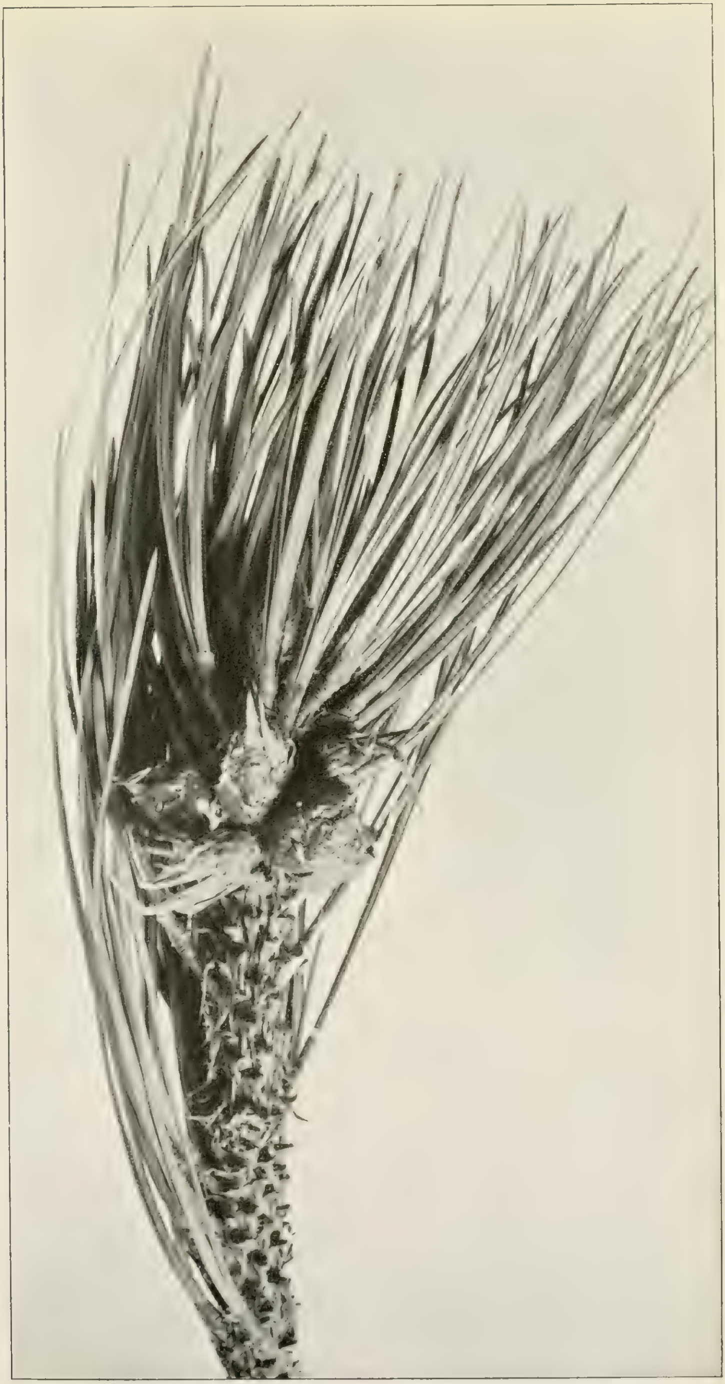


Seed Corn Maggot Work

PLATE 4

Insect Galls

Shoot of the rock pine, *Pinus scopulorum*, bearing greatly enlarged bud galls, from which was reared *Contarina oloradensis* Felt and *Dicrodiplosis gillettei* celt. (Original)



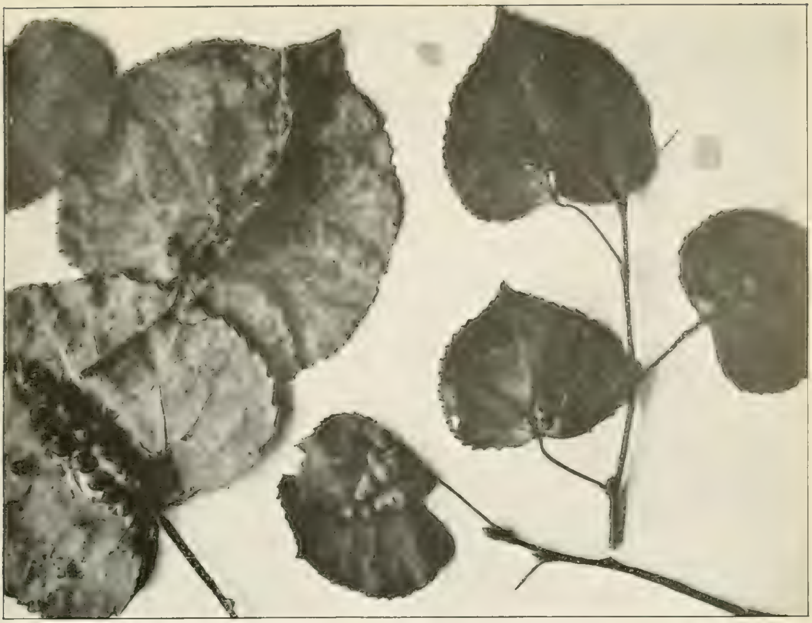
Pine Bud Gall

PLATE 5

Insect Galls

1 Leaves of poplar, Populus tremuloides, showing numerous globose red-tinted galls from which Mycodiplosis populifolia Felt was reared. (Original)

2 Cyme of elderberry, Sambucus canadensis, showing several enlarged blossoms infested with maggots of the elder flower midge, Youngomyia umbellicola O. S. (Original)



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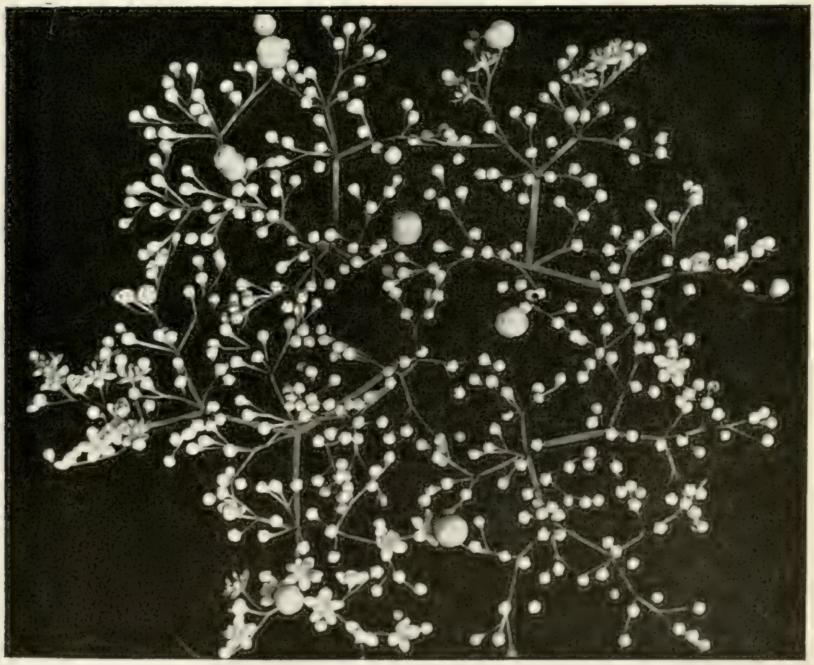


2

Poplar Leaf and Elder Flower Galls

PLATE 6

Gall Midge Wings

1 Wing of female of Contarinia pyrivora Riley, C. 490 x 20

2 Wing of male of Contarinia viatica Felt, C. 105 x 20

3 Wing of male of Contarinia divaricata Felt, C. 350 x 20

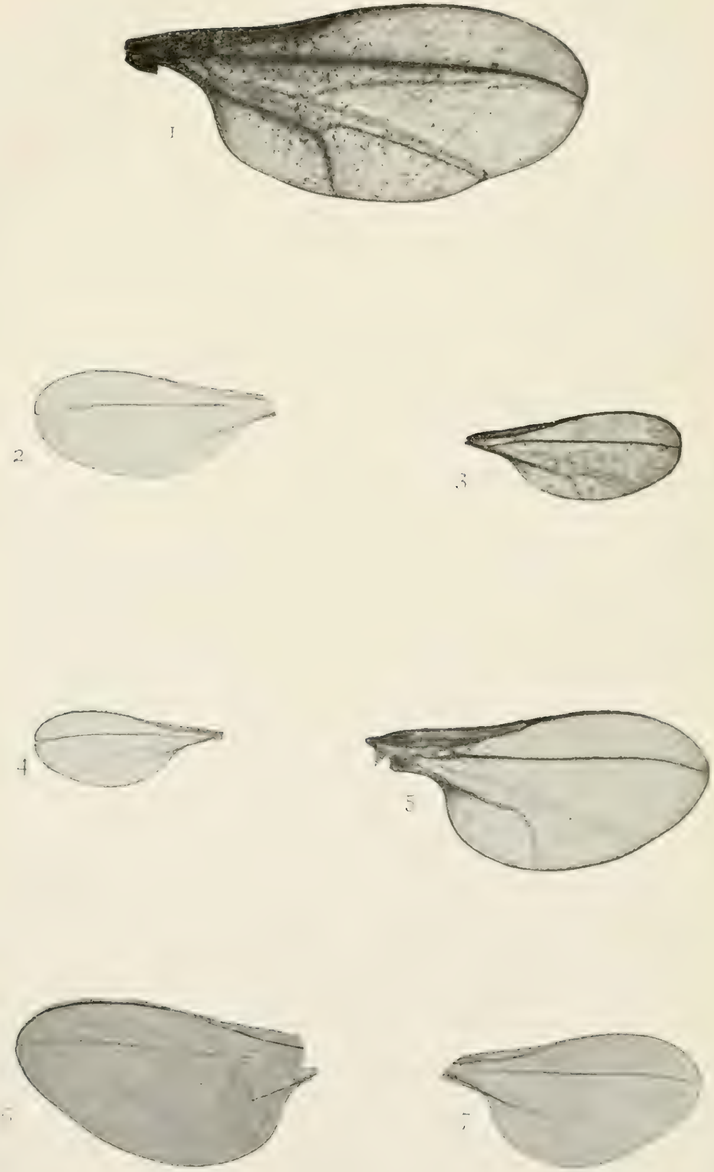
4 Wing of male of Contarinia trifolii Felt, C. 108 x 20

5 Wing of male of Lobopteromyia tiliae Felt, C. 25 x 20

6 Wing of male of Lobopteromyia abdominalis Felt, C. 16 x 20

7 Wing of male of Lobopteromyia filicis Felt, C. 20 x 20

Plate 6



Gall Midge Wings

PLATE 7

Gall Midge Wings

1 Wing of male of Youngomyia rubida Felt, C. 423 x 20

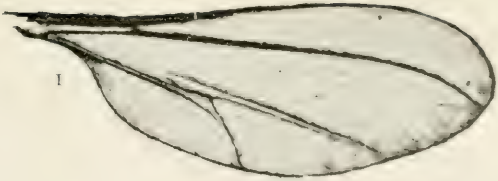
2 Wing of male of Youngomyia podophyllae Felt, C. 207 x 20

3 Wing of female of Youngomyia producta Felt, C. 474 x 20

4 Wing of male of Aphidoletes hamamelidis C. 401 x 20

5 Wing of male of Bremia filicis C. 397 x 20

Plate 7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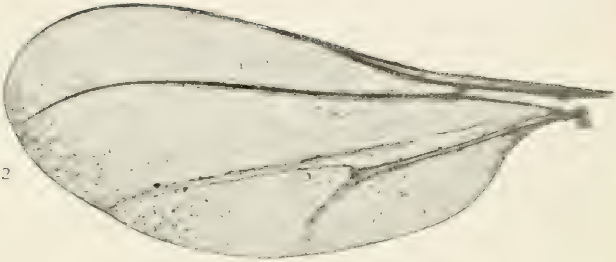
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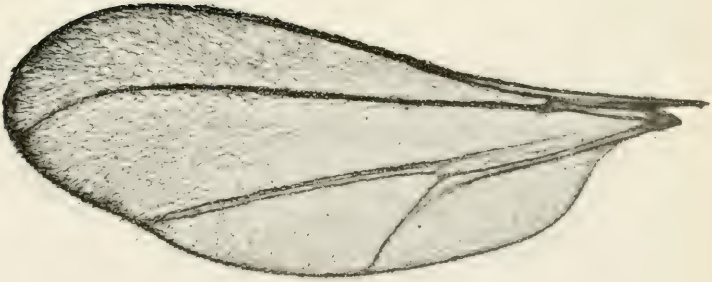
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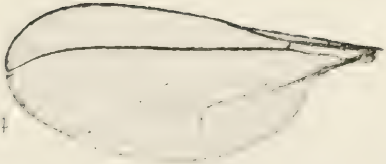
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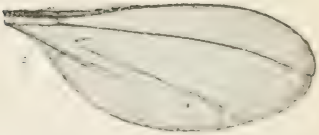


Gall Midge Wings

PLATE 8

Gall Midge Wings

1 Wing of male of Mycodiplosis alternata Felt, C. 209 x 20

2 Wing of male of Mycodiplosis hudsoni Felt, C. 188 x 20

3 Wing of male of Mycodiplosis tsugae Felt, C. 168a x 20

4 Wing of male of Mycodiplosis rotundata Felt, C. 564 x 20

5 Wing of male of Feltiella pini Felt, C. 348 x 20

6 Wing of male of Bremia caricis Felt, C. 292 x 20

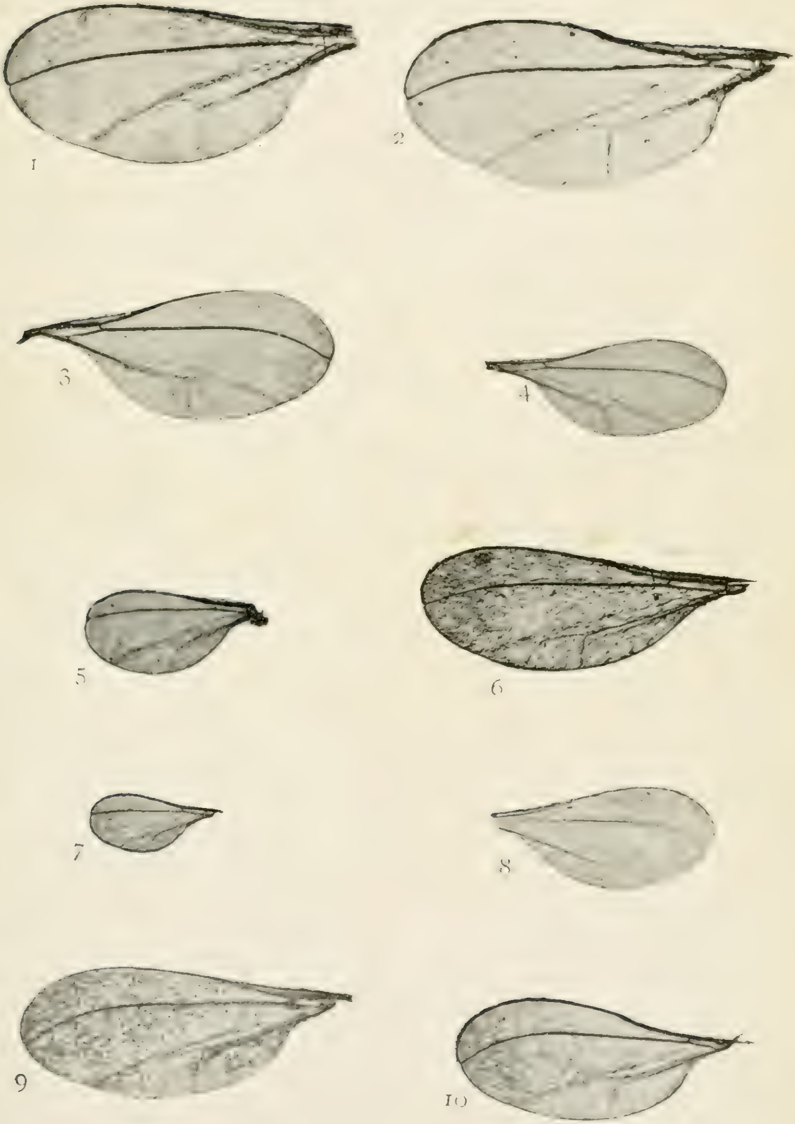
7 Wing of male of Mycodiplosis reducta Felt, C. 479 x 20

8 Wing of male of Hyperdiplosis lobata Felt, C. 132 x 20

9 Wing of male of Karschomyia viburni Felt, C. 219 x 20

10 Wing of male of Lobodiplosis acerina Felt, C. 269 x 20

Plate 8



Gall Midge Wings

PLATE 9

Gall Midge Genitalia

1 Genitalia of Aphidoletes recurvata Felt, C. 825 x 260

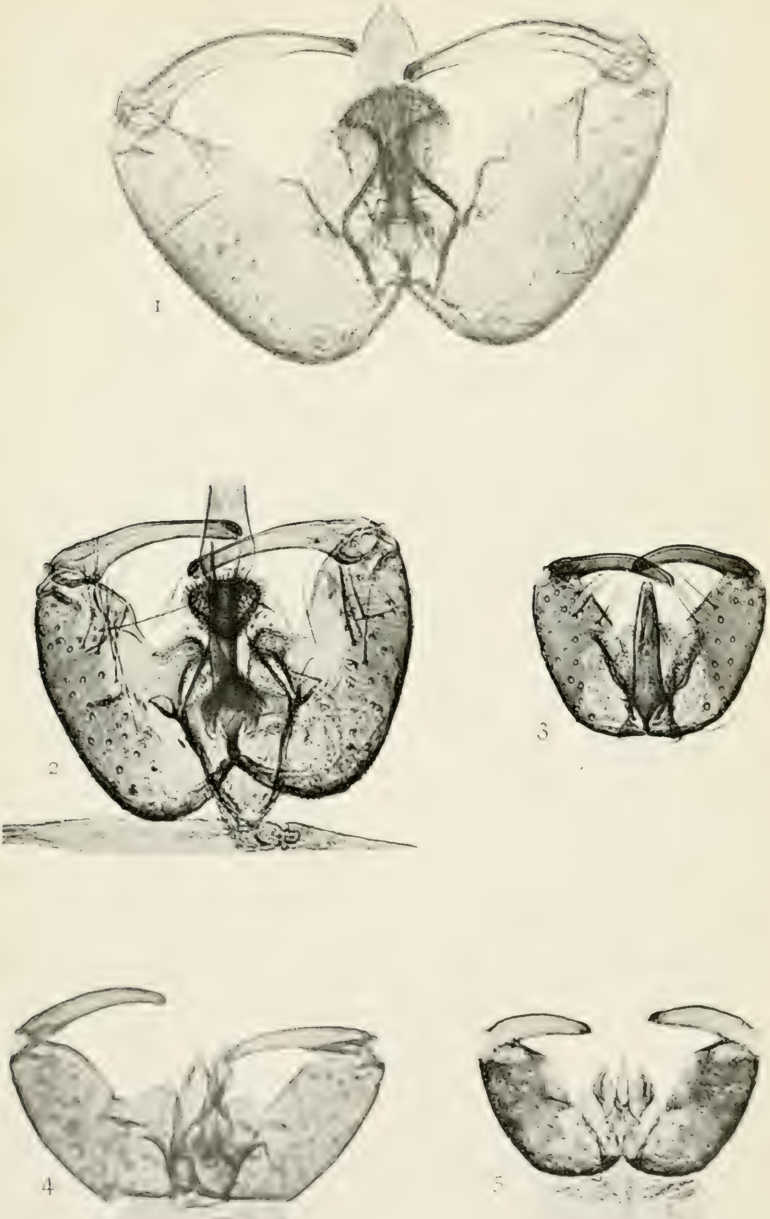
2 Genitalia of Aphidoletes hamamelidis Felt, C. 401 x 260

3 Genitalia of Bremia podophyllae Felt, C. 352 x 260

4 Genitalia of Bremia caricis Felt, C. 292 x 260

5 Genitalia of Contarinia ampelophila Felt, C. 9 x 260

Plate 9



Gall Midge Genitalia

PLATE 10

Gall Midge Genitalia

1 Genitalia of Lobopteromyia consobrina Felt, C. 61 x 260

2 Genitalia of Lobopteromyia filicis Felt, C. 20 x 260

3 Genitalia of Coquillettomyia lobata Felt, C. 176 x 260

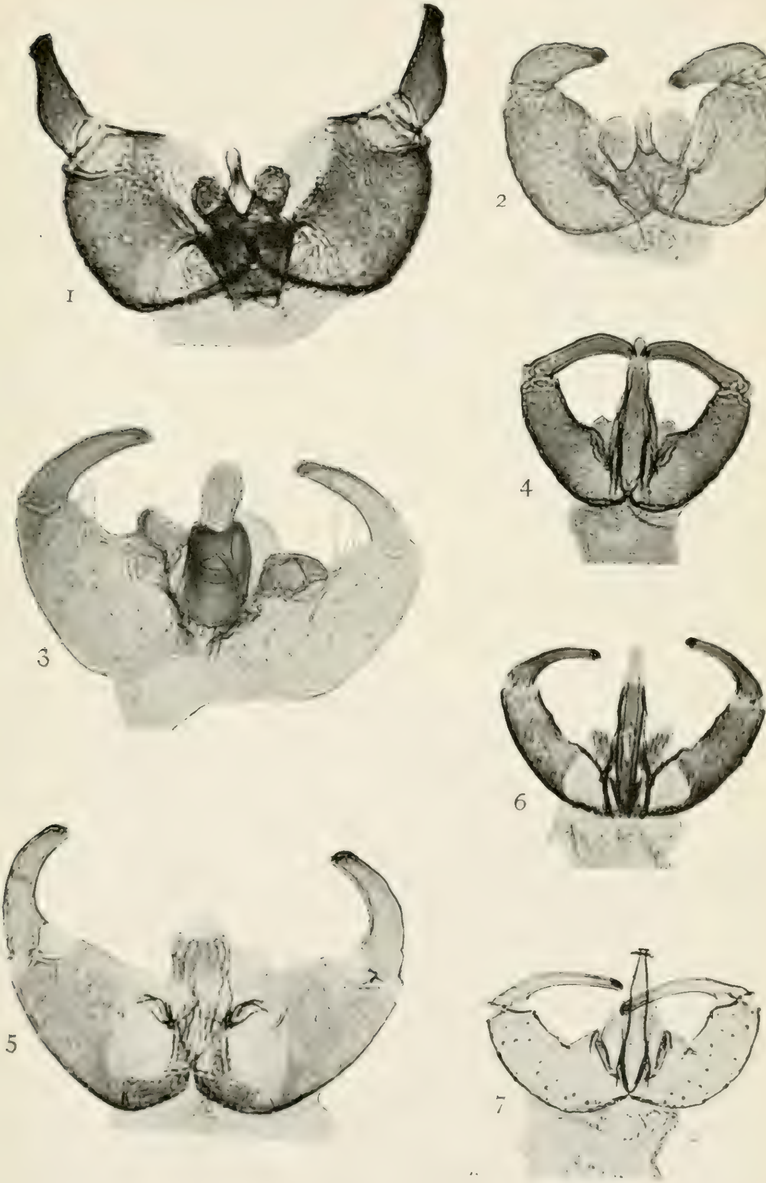
4 Genitalia of Mycodiplosis contracta Felt, C. 671 x 260

5 Genitalia of Mycodiplosis coryli Felt, C. 237 x 260

6 Genitalia of Feltiella pini Felt, C. 348 x 260

7 Genitalia of Feltiella emarginata Felt, C. 191 x 260

Plate 10



Gall Midge Genitalia

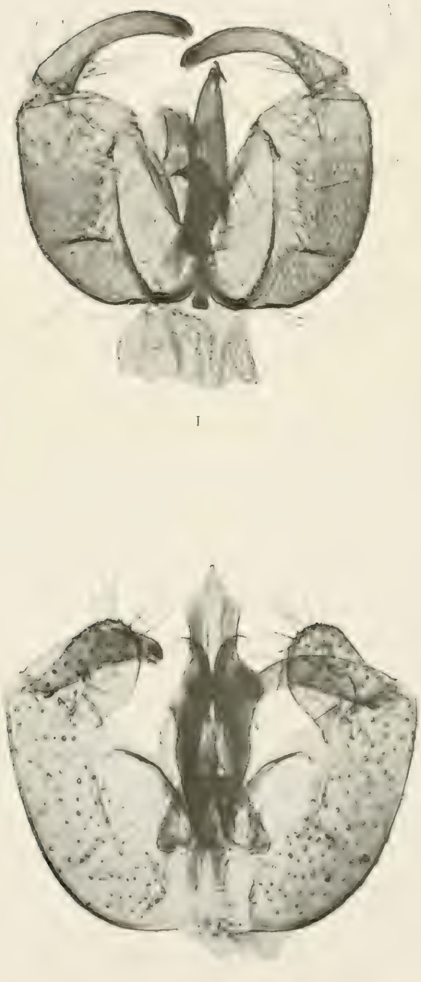
PLATE II

Gall Midge Genitalia

1. Genitalia of Lobodiplosis quercina Felt, C. 271 x 260
2. Genitalia of Lobodiplosis acerina Felt, C. 243 x 260

Figs. 1 and 2 reprinted from N. Y. State Mus. Bul. 124

Plate 11



Gall Midge Genitalia

PLATE 12

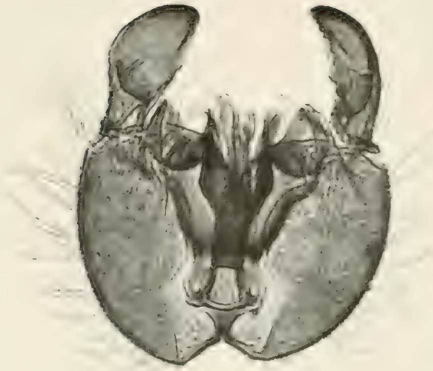
Gall Midge Genitalia

1 Genitalia of Karschomyia viburni Felt, C. 89 x 260

2 Genitalia of Youngomyia rubida Felt, C. 423 x 260

Figs. 1 and 2 reprinted from N. Y. State Mus. Bul. 124

Plate 12



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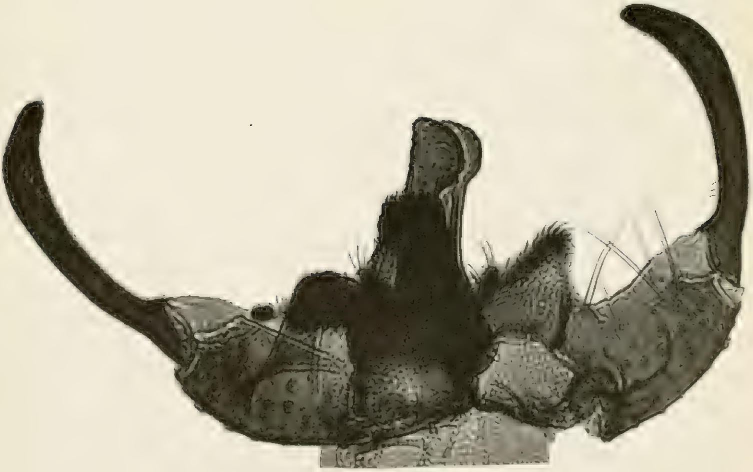

2

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The University of the State of New York
New York State Museum
JOHN M. CLARKE, DIRECTOR

KEY TO AMERICAN INSECT GALLS

BY EPHRAIM PORTER FELT D. Sc.

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The University of the State of New York
Science Department, May 4, 1917

Dr John H. Finley
President of the University

SIR:

I transmit herewith and recommend for publication as a bulletin of the State Museum, the accompanying manuscript prepared by Dr Ephraim P. Felt, State Entomologist, and entitled: *A Key to American Insect Galls.* The manuscript is accompanied by the necessary illustrative material.

Very respectfully yours

JOHN M. CLARKE
Director

THE UNIVERSITY OF THE STATE OF NEW YORK
OFFICE OF THE PRESIDENT

Approved for publication this 10th day of May 1917

Thos E. Finegan

Deputy Commissioner of Education

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New York State Museum

John M. Clarke, *Director*

KEY TO AMERICAN INSECT GALLS

BY

EPHRAIM PORTER FELT D. SC.

INTRODUCTION

Insect galls are obvious and frequently excite surprise because of the strange form or the wonderful coloring and delicacy of structure. The fresh, well-developed gall of the wool sower is one of the most beautiful of natural objects, while the delicately colored galls of Itonida anthici on bald cypress may occasionally be found in such numbers as to suggest a beautiful group of dainty flowers, structures very different from what normally occur on this tree and therefore even more surprising. The great variety of galls found upon the oaks and the interesting alternation of generations characteristic of the gall wasps challenge our admiration and incite to further study. The same is true though possibly to a less marked degree, of the hosts of fragile gall midges, forms which have learned to subsist upon various portions of a very large number of plants and, like the gall wasps, offer many biological puzzles to stimulate the earnest inquirer. Much of this is also true of the gall-making plant lice with their migrations and very dissimilar alternate host plants.

The origin and development of these growths are no less interesting than the deformities themselves. The gall-making habit among insects has undoubtedly developed independently in several widely separated groups and must have originated in a mutual reaction between the insects and their host plants, which has reached its climax in the many apparently inexplicable deformations of the present day. All stages of the process may be observed among the gall midges, some of which live among succulent fungous growths and either feed a little upon the fungi or obtain nourishment by absorption from the humid surfaces of the host. There are certain predaceous maggots in this group which have the mouth-parts greatly prolonged and apparently specially adapted to withdraw by suction the body fluids of their hosts. It may be one or the other or possibly a combination of the two methods which obtains among the fungivorous species. It is only a step from this to absorption with apparently no mechanical injury as in the leaf spot gall of the soft maple or the pod leaf galls mentioned below. The habit once started, it is possible to understand how the process might continue with infinite variations among a host of species, which is just what has taken place. The adaptations have continued along a number of lines to such an extent that many insect galls give little external evidence of their origin. Gall insects live at the expense of their hosts and in some instances, at least in the case of certain plant lice, the mere satisfying of the primitive instinct of hunger seems to be all that is necessary, not only to preserve life but to compel or cajole, as it were, the host plant, to grow or throw around its enemy a defensive barrier of gall within which the aphid may live in the presence of abundance, be comparatively safe and obtain like conditions for its numerous progeny. This sheltered, luxurious type of existence appears to be essential to many species and the tendencies along these lines have developed to such an extent that twenty-nine species of gall-making aphids, Phylloxera, are known to live at the expense of our hickories and in a similar manner a number of species of jumping plant lice, Pachypsylla, subsist on hackberry.

A very large proportion of insect galls begin growth in the bud and therefore at a time when the plant tissues are plastic and more easily modified. Not a few of the strange forms are to be explained as the arrested development of buds, fruit or leaves as the case may be, frequently accompanied by an excessive development or swelling of parts immediately adjacent to the source of irritation. This latter may be brought about by fluids in the egg or injected with it, as in the case of the galls of certain sawflies which become full size before the larvae hatch. Sometimes it is a reaction between the contents of the egg or larva and adjacent tissues through excretion or osmosis, a condition which must obtain in the familiar pod galls caused by the deformation of ash and spiraea leaves and showing no trace of mechanical abrasion or injury. Then there are numerous galls which develop as a result of continued stimulation by the gall maker itself, a relation evidenced by the fact that in the case of the beaked willow galls producing parasites, we find mostly partly developed galls which present marked differences from those containing healthy maggots.

This key to American insect galls is an outgrowth of earlier studies of the gall midges and was assembled primarily to facilitate the identification of the numerous galls submitted for name. It gives for the first time, for American forms, a comprehensive survey of the curious plant growths caused by insects and their near allies, the plant mites. With such a guide many amateurs will doubtless be encouraged to enter a charming and delightful field of study, one which may be followed with profit for the child at school as well as by the student of more mature years. The specialist will find herein references to the best accounts of the numerous species listed as well as a summary of American literature, while the many records of host relationships can not be ignored by the biologist and ecologist. The obvious concentration of many forms upon relatively few host plants, especially those with numerous closely allied species, such as the willows, oaks and goldenrods, and the great diversity of both structure and food habits among gall midges, all suggest interesting lines of study. These relationships are brought out more clearly in a tabulation of the hosts and galls (see page 215), where 1441 species are listed, 682 being gall midges and 445 gall wasps. The remainder of the plant deformations discussed in this work are produced by a few of the other two-winged flies or Diptera, four-winged flies or Hymenoptera, beetles or Coleoptera, moths or Lepidoptera, and the true bugs or Hemiptera, especially the plant lice and the plant mites or Eriophyidae, the last being represented by 161 species. The deformations, though numerous, by no means exhaust the possibilities and in the estimation of Mr L. H. Weld, a student of the Cynipidae, nearly one-third, mostly inhabitants of inconspicuous galls, are still unknown. It should also be remembered that extensive regions are comparatively unexplored for insect galls of all kinds.

There are not only a large number of different species of gall insects but occasionally some become exceedingly abundant; for example, there was, a few years ago, near Albany, a large oak with its smaller branches almost covered with the giant, beadlike swellings of the gouty oak gall, Andricus punctatus (fig. 57), and on rearing the gall wasps from a few twigs it was estimated that over 500,000 insects were then living at the expense of the one tree. Last summer the galls of Andricus gemmarius were so numerous on a large pin oak near Newton, N. J., that the sweet exudation from the deformations attracted hosts of bees and flies. The unusual noise, humming or "roaring" of these insects resulted in an examination which showed the large tree to be generally infested. The twig illustrated in figure 59 gives an idea of the abundance of the galls. Among gall midges the well-known Hessian fly frequently becomes numerous enough to destroy extensive areas of wheat; the Sorghum midge and the clover midge make it nearly impossible to grow the seed of these plants in certain sections, while the rose midge, the violet midge and the chrysanthemum midge are greenhouse species known only too well to the grower of these highly cherished flowers.

The collection and study of plant galls is a field open to many. The specimens are to be found at all times of the year and those with woody tissues require no special preparation if one desires to make a collection. It is not difficult in numerous instances, especially if collecting is deferred until the gall insects are nearly mature, to rear the producers, though some care is necessary to distinguish between the true gall makers and the very similar inquilines, or particularly in the case of gall midges, between gall makers and other frequently associated enemies. Gall insects are small, fragile, and can not be studied successfully without a good microscope, considerable technical skill and a moderately good collection and library.

Insect galls may be defined as vegetable excrescences resulting from insect activities and usually sheltering the immature stages of the producers, though a wide acquaintance with these growths demonstrates the existence of innumerable gradations between the apparently normal and the decidedly abnormal and, as a consequence, it is difficult to establish a satisfactory distinction between insect galls and deformations not worthy of classification under this term. Some would include the mere curling of leaves and while to a certain extent this is justified, in most cases unless the curling is pronounced the deformation has not been considered as a gall coming within the scope of this work.

The two most important groups of gall insects — the gall midges or the Itonididae, and the gall wasps or the Cynipidae — each contain species living at the expense of plants and producing little or no swelling of the plant tissues. In the former group there are to be found species, the young or the maggots of which live exposed upon the foliage, some of these evidently absorbing nourishment from the leaf tissues and producing a characteristic modification, such for example as the very common leaf spot caused by Cecidomyia ocellaris on soft maple leaves; others subsist upon fungi, some are predaceous, and the young of a number may be found in decaying wood or in subcortical tissues of the host and cause little or no disturbance of the plant functions. Such species are very likely to be reared by the student of insect galls and we have therefore included in the key a number of these forms which have been definitely associated with various food plants.

A comparison of the food habits of the gall midges or Itonididae and the gall wasps or Cynipidae is of more than passing interest. In the first place, the 682 galls produced by the midges occur on plants belonging to 69 botanical families and 202 genera. The larvae of 66 species live at the expense of the willows or Salicaceae (52 of these are found on Salix); 29 species occur upon the Juglandaceae, all but one infesting hickory or Carya; 43 attack the Fagaceae (36 of these being upon the oaks); 56 species produce galls on the Rosaceae, 24 on the Leguminosae, 22 upon the Vitaceae, and 151 on the Compositae. The most obvious concentration of species, aside from those mentioned above, is the 44 midges reared from Solidago and the 22 found upon aster. These figures are approximate, yet taken in connection with the great diversity in the structure of these small insects, indicate that this group has been able to maintain itself upon a great many different plants through a considerable physiological adaptability and that the distinctness of the species has been established by relatively small modifications in structure.

The gall wasps or Cynipidae present an entirely different condition so far as relation to the flora is concerned. They attack plants referable to only 6 botanical families and assignable to but 17 plant genera.[1] There is, however, a most striking concentration in food habits, since a very large proportion of the 445 gall makers subsist at the expense of the Fagaceae which, for this group, means the oaks, the exact number in our list being 359 though this figure, like the above, is an approximation; 38 species have been reared from members of the rose family or Rosaceae, 28 (Rhodites) living at the expense of the genus Rosa. The other species referable to the Cynipidae are scattered in their food habits, the most evident concentration, and this far from marked, being the 12 species reared from various Compositae, the genera Silphium and Lactuca supporting 4 and 3, respectively. This well-defined limitation in food habits is accompanied, as might be expected, by a high degree of specialization in structure.

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[1] Mr L. H. Weld has called our attention to two undescribed gall wasps which would change the above figures to 7 botanical families and 19 plant genera. There is also a South American species on Acacia.

The plant lice or Aphididae live on a great variety of plants, though the gall-making forms occur upon the members of relatively few plant families and genera, the most evident food preference being in the gall aphids belonging to the genus Phylloxera, with its 29 species producing deformations on hickories. The nearly allied jumping plant lice or Psyllidae present a similar condition in the genus Pachypsylla and its relation to the numerous galls upon Celtis.

It will be seen by referring to the key that the galls are grouped by food plants and that in the case of those infested by numerous gall insects, additional divisions are made according to the location on the plant and the structure of the galls. The difference between the leaf and twig gall is not sharply defined in nature, since the same species may produce a gall diverting only a portion of the nourishment and a part of the leaf is therefore clearly present, while in other cases the deformation may develop to such an extent that there is no hint of a leaf and the gall is apparently, at least, a twig deformation; consequently some galls are entered more than once because of an apparently different origin and the same is true to a certain extent in regard to variations in form.

A few special terms used in the key are explained below:

Blister galls. This is applied primarily to the blisterlike, apparently fungous-filled swellings occurring upon the leaves of Solidago and aster and usually inhabited by species of Asteromyia.

Bud galls. Deformations which evidently originate from buds. They may vary from a plainly aborted bud to a great enlargement developing from such parts.

Bullet galls. A term which has become somewhat general and refers in particular to the nearly solid, monothalamous bullet galls produced by certain species of Disholcaspis upon oak twigs.

Cecidomyia. A term used here in a broad sense and applied to any species referable to the family Itonididae and which can not be readily assigned to more closely defined genera.

Erineum is applied in a general way to the hairy growths upon leaf surfaces inhabited by species of plant mites or Eriophyidae.

Flower galls. Deformed flowers or masses of flowers, frequently more or less variable in shape.

Fruit galls. This term is limited to species inhabiting the seeds or fruits and in some cases producing marked deformities.

Leaf galls. The term is a broad one applying to all deformations definitely associated with leaves.

Leaf spots. A descriptive term which has been adopted for some leaf galls which are more evident because of the marked discoloration than on account of size or elevation.

Monothalamous. Literally, one chamber; a convenient term used to designate galls inhabited by a larva or larvae in one cell or cavity.

Oak apples. A general term applied to the familiar, large galls on oak produced by the genus Amphibolips and referring in particular to the large oak apple and the empty oak apple.

Pouch galls are simply pouchlike deformities usually caused by a depression in the leaf surface eventuating in a pouchlike cavity, such, for example, as that inhabited by a number of gall mites.

Root galls is a term applied to any swellings upon roots.

Rosette galls are simply a specialized type of bud gall with the central cell or cells surrounded by a rosette of partly developed leaves.

Stem or twig galls are deformations restricted to that portion of the plant.

Subcortical galls are swellings just under the bark and usually occurring upon one side of a twig or stem.

It is frequently very convenient to be certain of the group to which the gall maker belongs and the following abbreviations are used in the key.

Acarid. An abbreviation for Acarina and in this work refers particularly to the gall mites or Eriophyidae. The galls produced by this group vary from a simple erineum to a more or less modified pouch gall and are most easily recognized in many cases by the abnormally developed plant hairs and the orifice usually guarded by a fuzzy growth. The presence of extremely minute, four-legged mites is characteristic of these deformities.

Aphid. An abbreviation for Aphididae or plant lice and in this work applied to the gall-producing forms. Aphid galls are most easily recognized by the more or less distinct orifice and the characteristic inhabitants.

Coleop. An abbreviation for Coleoptera or beetles, the gall-making larvae of which are legless or nearly so and characterized by the possession of a head and well-developed jaws.

Itonid. An abbreviation for Itonididae or gall midges, a group which produces an immense number of galls — sometimes closed and sometimes partly open — and most easily recognized by the yellowish or white maggots with a more or less developed Y-shaped " breastbone " and a distinct head.

Cynipid. An abbreviation for Cynipidae or gall wasps and also used as a convenient designation for species not referable to well-defined genera. The group is remarkable because of its producing a large number and variety of closed galls, especially on oaks, the larvae being in individual cells imbedded in the plant tissues, headless and white.

Dipt. An abbreviation for Diptera or the true flies and used in this work where the more restrictive term Itonid can not be employed. The young are headless, legless, usually white maggots. The galls vary greatly in shape and structure.

Hemip. An abbreviation for Hemiptera or true bugs which includes a number of species not referable to the more closely limited term Aphididae or plant lice. The galls are variable in appearance.

Hym. An abbreviation for Hymenoptera or members of the wasp and bee family and in this work applied especially to those not included under the term Cynipidae. The Nematid larvae are false caterpillars with numerous legs and a conspicuous head. The young of the Chalcids are white and without head or legs. The galls are variable in appearance.

Lepid. An abbreviation for Lepidoptera or the butterflies and moths. The young or caterpillars of the latter inhabit a number of galls and may be distinguished from other gall insects by the well-developed head and the presence usually of both true and abdominal legs.

There is no reason why many galls should not have well-recognized common names. The writer has taken pains to use all those worthy of perpetuation and, in addition, following suggestions from various sources, has incorporated in the key a number of vernacular terms, some of which at least, it is hoped, will become current.

The abbreviated references following the description of the gall give, first, the name or an abbreviation of the name of the author, second, the year of publication (in case there is more than one in a year they are distinguished by letters) and, third, the page. These citations are given in full in the bibliography.

The nomenclature used is that current at the time the manuscript was completed, though a recent work: " The Type Species of the Genera of the Cynipoidea or the Gall Wasps and Parasitic Cynipoides " by S. A. Rohwer and Margaret M. Fagan (U. S.

National Museum Proceedings 53:357–80, 1917) indicates that a change must be made in several of the best known Cynipid genera, namely, that Cynips of authors not Linnaeus is Adleria Rohw. and Fag., Dryophanta Forst. is Cynips Linnaeus and that Rhodites Hartig and Diplolepis Goeff. are synonyms. In view of the fact that the above genera are so well known and have been so generally used in literature, it was considered best to continue these names in this key, since it would be decidedly more convenient for those wishing to refer to earlier accounts.

Certain insect galls are commercially valuable and on looking into the matter one may be surprised at the important place they hold in trade. It is well known that some oak galls have long been used in the manufacture of ink, particularly the more permanent writing fluids. The amost important gall for this purpose is the Eurasian Cynips gallae-tinctoriae, variously known as the Aleppo gall, Turkey gall, Levant gall, gall nut, gall of commerce and ink marble. This gall contains 65 per cent of tannic acid and is mostly used for dyeing wool and skins. The Knoppern or acorn gall, produced by Cynips quercus-calycis contains 50 per cent tannic acid and is next in importance to the Aleppo gall. There is a Chinese sumac gall produced by a species of Pemphigus, closely allied to the American P. rhois, that is imported in considerable quantities because of its high tannin content, a characteristic also of our native gall. The air dried Chinese gall contains over 60 per cent tannic acid and our native sumac gall about 8 per cent less. It is probable that a number of American oak galls in particular could be utilized to advantage. Insect galls are used in medicine on account of their astringent properties and a few have served as articles of food, notably that of a species of Aylax on Salvia pomifera which forms an article of commerce in the Near East and a somewhat common catmint gall, Aylax glechomae. Both are said to have an agreeable taste and the sweet odor of the host plant. The producer of the latter has become well established in this country. Other galls are known to be edible and it is possible that they could be turned to good account when the insects are unusually abundant. There is a record of a black oak gall somewhat resembling wheat and provisionally referred to the genus Callirhytis being so abundant in Missouri and Arkansas some years ago that it was fed to various domestic animals with excellent results. One gall, that of Cynips theophrastea, was used by Greeks as a fuel in lamps. For an excellent historical account of the use of insect galls, the reader is referred to a recent article by Miss Fagan cited in the bibliography.

Through the courtesy of the officials of the American Museum of Natural History we have been allowed to use the magnificent series of Beutenmueller illustrations of certain Cynipid galls, and by arrangement with the executor of the will of the late S. Millett Thompson of Providence, R. I., we were at liberty to reproduce figures from the original photographs used in the Illustrated Catalogue of American Insect Galls by the late Dr Millett Taylor Thompson. The late Cora H. Clarke of Boston, Mass., well known as an enthusiastic student of insect galls, kindly placed at our disposal a number of excellent illustrations, and with the consent of Mr L. H. Weld of Evanston, Ill., we have reproduced a number of his admirable photographs. Miss Fannie A. Stebbins, Springfield, Mass., has loaned the use of several illustrations. These and the approximately two hundred original line drawings and a number of illustrations appearing in earlier publications of the office are also incorporated in this work, the whole making an unrivaled series in the literature of American insect galls.

KEY TO AMERICAN INSECT GALLS

Polypodiaceae (ferns)

Cystopteris fragilis (bladder fern)

Root gall (Cosens, in litt. May 3, '15)
Itonid. Cecidomyia sp

Ephedraceae

Ephedra trifurca

Fusiform twig gall, length 12 mm. Fig. 1. Ckll. '98, p. 327
Itonid. Lasioptera ephedrae Ckll.

Irregular, subcortical, resinous gall. Ckll. '02, p. 184
Itonid. Lasioptera ephedricola Ckll.

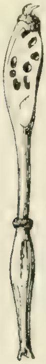

Fig. 1. Lasioptera ephedrae Ckll., showing two galls, one in section. (Original)

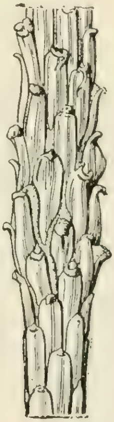

Fig. 2. Gouty pine midge, Retinodiplosis inopis O. S. Typical enlargement of twig. (Original)

Pinaceae (pines)

Pinus (pine)

Reared from fungous affected heartwood, P. rigida. Felt '13m, p. 191
Itonid. Monardia lignivora Felt

Reared from Scolytid galleries in pine. Felt '13m, p. 188
Itonid. Monardia pinicorticis Felt

Reared from bark of P. virginiana. Felt '07e, p. 23
Itonid. Winnertzia pinicorticis Felt

Subcortical twig swellings with pitch exudations, resinous cocoons on needles of P. rigida. Fig. 2. Felt '12h, p 368
Itonid. Gouty pitch pine midge, Retinodiplosis inopis O. S.

Spherical or ovoid twig swellings, length 6 to 18 mm, on hard pine.

Coleopt. Pine gall weevil, Podapion gallicola Riley

Irregular, subhemispheric or oval, eccentric twig swellings, length 1.5 to 3 cm, diameter 1 to 2 cm, on P. taeda. Fig. 4.

Itonid. Retinodiplosis sp. a2 12

Reared from resin masses on P. strobus. Felt, '18d, p. 382, 383

Itonid. Banded pitch midge, Retinodiplosis albitarsi Felt

Itonid. Mycodiplosis packardi Felt

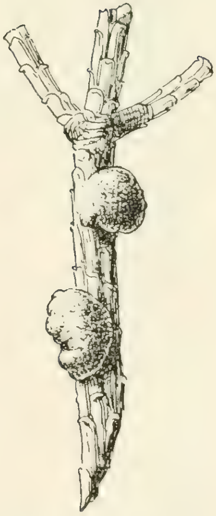

Fig. 3. Pitch midge, Retinodiplosis resinicola O. S. Typical pitch exudations. (Original)

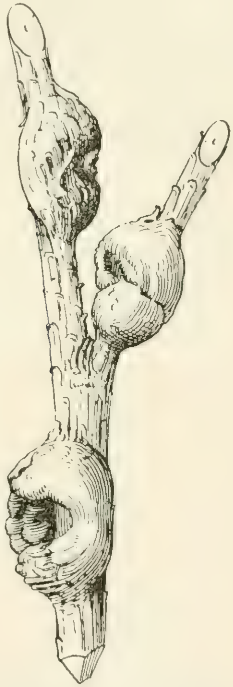

Fig. 4. Retinodiplosis sp. Scars on Pinus taeda, probably the work of a midge. (Original)

Reared from extruded resin masses on P. rigida. Fig. 3. Felt '06b, p. 410

Itonid. Pitch midge, Retinodiplosis resinicola O. S.

Reared from extruded resin masses on P. radiata. Wlms. '09, p. 1

Itonid. Western pitch midge, Retinodiplosis resinicoloides Wlms.

Reared from pitch masses on long leaved pine, P. palustris. Felt '15h, p. 408

Itonid. Southern pitch midge, Retinodiplosis palustris Felt

A subglobose terminal swelling involving the tip of the new growth of P. edulis, diameter 5 mm. This kills the apical needles, though the lower ones continue to develop, and in old deformities may produce a ring of short, stout, upstanding needles surrounding a central dead area. Larvae pale orange.

Itonid. Cecidomyia sp. a2823

Apical budlike swelling, diameter 1 cm on P. scopulorum. Figs. 5, 6. Felt '12f, p. 240

Itonid. Pine bud gall, Contarinia coloradensis Felt

Same gall as above. Felt '11k, p. 549

Itonid. Dicrodiplosis gillettei Felt

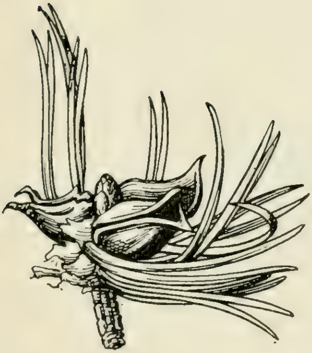

Fig. 5. Pine bud gall, Contarinia coloradensis Felt. Three galls. (Original)

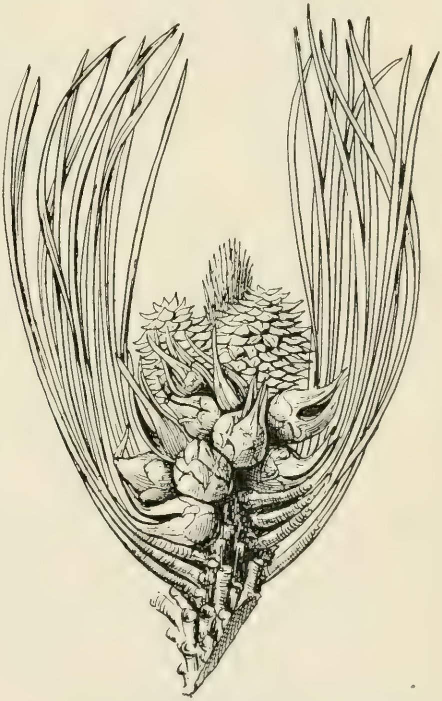

Fig. 6. Pine bud gall, Contarinia coloradensis Felt. Cluster of galls on P. scopulorum. (Original)

Aborted needle clusters, base subglobose. On P. rigida. Fig. 7. Felt '06b, p. 423

Itonid. Pine needle gall, Cecidomyia pinirigidae Pack.

Globose swellings at base of needles of P. edulis, diameter 4 mm, the aborted needles with a length of 1 to 3 cm, the walls thick. Felt, '18d, p. 381

Itonid. ?Thecodiplosis cockerelli Felt

Elongate, cylindric or fusiform green or purplish-red swellings at the base of the needles of P. edulis, length 1.5 cm, diameter 3 mm, the walls moderately thin and with a large cavity containing several larvae. Occurs also on P. monophyllus (a2857)

Itonid. Cecidomyia sp. a2821

Kidney shaped enlargements at base of needles of P. edulis, length 7 mm, diameter 4 mm, the walls thick and the needles rudimentary. Fig. 8.

Itonid. Thecodiplosis cockerelli Felt

Globose swelling at base of needles on P. virginiana. Fig. 11. Felt ’12e, p. 148

Itonid. Janetiella coloradensis Felt

Base of needles of P. radiata. Snow and Mills ’00, p. 489

Itonid. Western pine needle gall, Thecodiplosis piniradiatae Sn. & Mlls.

Picea (spruce)

Green or brown, polythalamous, conelike swellings on Norway spruce. Fig. 9. Felt ’06b, p. 189

Aphid. Spruce cone gall, Chermes abietis Linn.

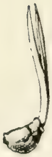

Fig. 7. Pine needle gall, Cecidomyia pinirigidae Pack. Typical swelling at base of the leaf. (Original)

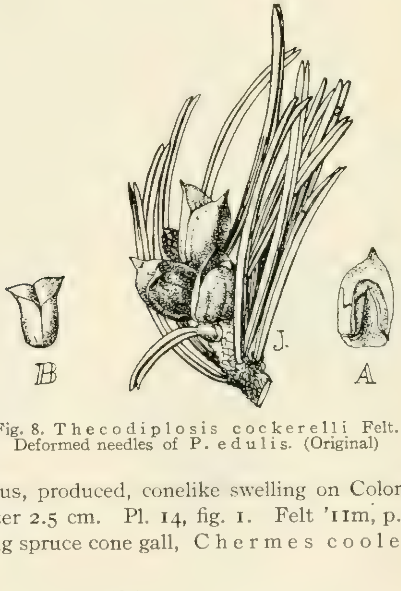

Fig. 8. Thecodiplosis cockerelli Felt. Deformed needles of P. edulis. (Original)

Green or brown, polythalamous, produced, conelike swelling on Colorado blue spruce, length 5 cm, diameter 2.5 cm. Pl. 14, fig. 1. Felt ’11m, p. 37

Aphid. Long spruce cone gall, Chermes cooleyi Gill.

Abies (fir)

Reared from seeds. Fig. 10. Felt ’15e, p. 162

Itonid. Fir seed midge, Dasyneura canadensis Felt

Infertile seed of Douglas fir. Crosby ’09, p. 379

Hym. Fir seed wasp, Megastigmus spermotrophus Wachtl.

Apical bud gall. Pl. 5, fig. 9. Felt ’14j, p. 77

Itonid. Spruce bud midge, Rhabdophaga swainei Felt

Bud galls and swellings at base of leaves. Felt ’07a, p. 123

Itonid. Spruce gall midge, Phytophaga tsugae Felt [1]

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[1] Probably occurs on hemlock also.

Subglobular basal swellings of leaves, length 3 mm on balsam. Pl. 7, fig. 1. Lintn, '88, p. 60

Itonid. Balsam gall midge, Cecidomyia balsamicola Lintn.

Tsuga (hemlock)

Larvae in Melanophila galleries. Felt '13h, p. 214

Itonid. Hemlock bark midge, Camptomyia tsugae Felt

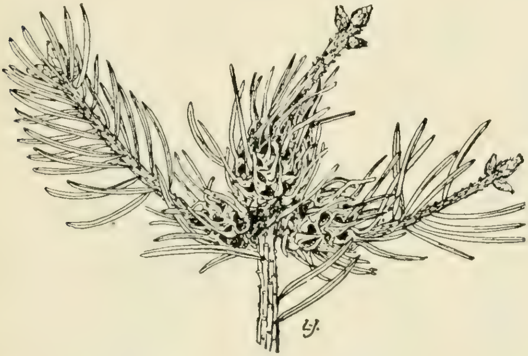

Fig. 9. Spruce cone gall, Chermes abietis Linn. Normal type of gall. (Author's illustration)

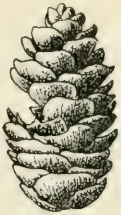

Fig. 10. Fir seed midge, Dasyneura canadensis Felt. Infested cone. (Original)

Taxodium (bald cypress)

Irregularly globose, thick-walled, somewhat spongy, modified seeds in cones diameter 5 to 7 mm. Fig. 12. Felt '16g, p. 415

Itonid. Cypress seed midge, Retinodiplosis taxodii Felt

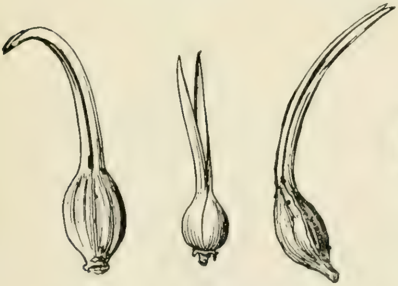

Fig. 11. Janetiella coloradensis. Felt. Deformed needles of P. virginiana. (Original)

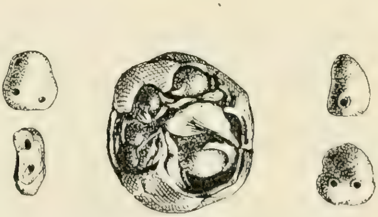

Fig. 12. Cypress seed midge, Retinodiplosis taxodii Felt. Deformed cone and seeds. (Original)

Fusiform twig gall, length 1.25 cm. Felt '12f, p. 242

Itonid. Cypress twig gall, Thecodiplosis ananassi Riley

Whitish, flower-shaped, fungoid gall. Fig. 13. Felt '13i, p. 278

Itonid. Cypress flower gall, Itonida anthici Felt

A conical, globular or elongate deformation of the leaf. Felt '11k, p. 556

Itonid. Cypress leaf gall, Itonida taxodii Felt

Chamaecyparis (white cedar, cypress)

Bud gall, quadrangular in section, the size larger than the normal bud, densely imbricate and containing a narrow cell inhabited by a reddish larva. Mex. Trotter '11, p. 122

Itonid. White cedar bud gall, Cecidomyia sp.

Reared from seeds of C. lawsoniana Felt '17, p. 194

Itonid. Janetiella siskiyou Felt

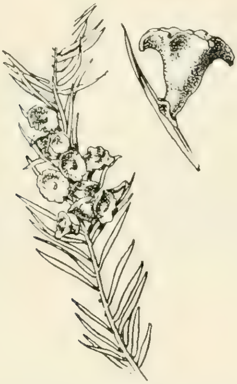

Fig. 13. Cypress flower gall, Itonida anthici Felt. Cluster of flower-like galls and one gall enlarged. (Original)

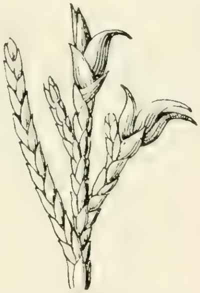

Fig. 14. Juniper rosette gall, Cynips sp., a2602, enlarged. (Original)

Thuja (arbor vitae)

Bud gall

Itonid. Arbor vitae bud gall, Rhopalomyia sp.

Leaf deformation covered with eggs and cast skins. Parrott '06, p. 288

Acarid. Eriophyes thujae Garm.

Juniperus (juniper)

Reared from slightly enlarged fruit of J. californica, J. monospermum and also from a conical, purplish, apical bud gall, with three or four diverging lobes when mature, length 1 cm, diameter 3 mm

Itonid. Juniper berry midge, Walshomyia juniperina Felt

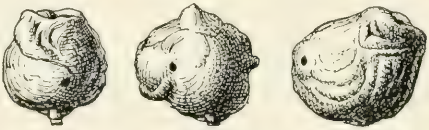

Fig. 15. Juniper berry wasp, Chalcid sp., a2603. Deformed berries enlarged. (Original)

Deformed infertile fruit of J. pachyphlaea, the interior corky, brown. Econ. Ent. Jour. 11:149 Acarid. Eriophyes ramosus Hodgk. a2858

Apical, reddish, conical gall on J. utahensis. Felt '12e, p. 148

Itonid. Juniper cone gall, Oligotrophus betheli Felt

Reared from same gall

Itonid. Arthrocnodax sp.

Deformed, infertile berries of J. scopulorum. Fig. 15.

Hym. Juniper berry wasp, Chalcid sp. a2603

Flowerlike, apical, greenish brown or pinkish deformations composed of four reflexed and slightly thickened leaf scales on J. scopulorum. Fig. 14.

Cynipid. Juniper rosette gall, Cynips sp. a2602

Thickened, slightly reflexed reddish-brown leaflets of last year's growth on J. scopulorum, possibly an older stage of the preceding.

? Itonid. ? Cecidomyia sp.[1] a2827

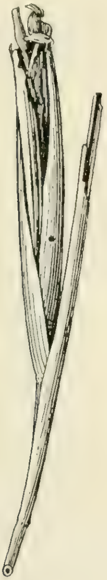

Fig. 16. Wheat joint worm, Isosoma grande Riley. Infested stem. (Original)

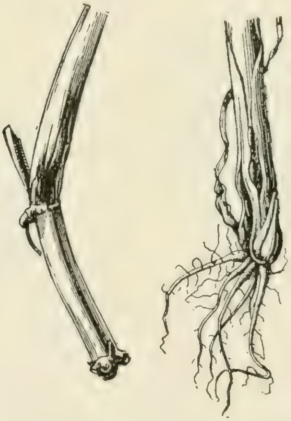

Fig. 17. Hessian fly, Phytophaga destructor Say. Infested stems showing pupae. (Author's illustration)

Prickly burrlike bud galls with numerous short, nearly straight leaves, none reflexed, diameter .5 cm. Felt '18d, p. 380

Itonid. Allomyia juniperi Felt

Apical rosette gall, diameter 1.5 cm, greenish (brown when old) with a variable whitish pubescence, leaf bracts reflexed

Itonid. Cecidomyia sp. a2814

Globose twig enlargement showing a gelatinous growth in June, diameter 3 cm.

Fungus. Cedar apple, Gymnosporangium globosum

Sabina sabinoides (wild Texas or mountain cedar)

Reared from bud gall. Felt '16, p. 30

Itonid. Mountain cedar midge, Walshomyia texana Felt

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[1] Epitetrasticus silvae Girault was reared in large numbers.

Gramineae (grasses)

Reared from grass. Felt '11j, p. 461
Itonid. Neolasioptera squamosa Felt

Triticum (wheat)

Reared from pinkish larvae on roots (C. N. Ainslie)
Itonid. Lestremia sp.

Inhabiting stems. Fig. 16. Howard '95, p. 9
Hym. Wheat joint worm, Isosoma grande Ril.

Deformed leaf sheathes. Pl. 4, fig. 6. Doane '16, p. 398
Hym. Wheat-sheath joint worm, Isosoma vaginicolum Doane

Collected on wheat. Howard '95, p. 15
Hym. Wheat joint worm, Isosoma websteri How.

Stems bored and discolored. Comst. '90, p. 127
Hym. Wheat stem sawfly, Cephus pygmaeus Linn.

Infesting stems at the uppermost node. Coq. '98, p. 74
Dipt. Wheat stem maggot, Oscinis carbonaria Lw.

Boring wheat stems. Webst. & Reeves '10
Hym. Western grass-stem sawfly, Cephus occidentalis Ril & Marl.

Under the leaf sheath. Fig. 17. Felt '02, p. 705
Itonid. Hessian fly, Phytophaga destructor Say

Probably the same as the preceding
Itonid. Cecidomyia culmicola Morr.

Associated with the above. Fitch '61, p. 831
Itonid. Cecidomyia inimica Fitch

Associated with the above. Fitch '46, p. 285
Itonid. Lestodiplosis graminis Fitch

Under the leaf sheath. Coq. '98, p. 70.
Dipt. Chlorops proxima Say

Reared from wheat heads. Felt '12g, p. 289
Itonid. Wheat midge, Itonida tritici Felt

Reared from wheat heads. Felt '12g, p. 287
Itonid. European wheat midge, Thecodiplosis mosellana Gehin

Reared from wheat heads. Felt '12g, p. 288
Itonid. Prodiplosis fitchii Felt

Eriocoma cuspidata

Inhabiting grass stalks. Howard '95, p. 10
Hym. Grass joint worm, Isosoma californicum How.

Tripsacum dactyloides (gama or sesame grass)

Larvae between leaf blades. Felt '10a, p. 10
Itonid. Lasioptera tripsaci Felt

Sorghum saccharatum (Sorghum)

Reared from seeds. Dean '10, p. 39
Itonid. Sorghum midge, Contarinia sorghicola Coq.

Sorghum halpense (Johnson grass)

Reared from seeds. Dean '10, p. 39
Itonid. Sorghum midge, Contarinia sorghicola Coq.

? *Digitaria sanguinalis* (crab grass)

Reduced, swollen head, presumably resembling that of Asteromyia agrostis, on Muhlenbergia. Coq. '98, p. 71
Dipt. False spike grass fly, Chlorops graminea Coq.

Panicum (panic grass)

Ovipositing in stem. Felt '08e, p. 326
Itonid. Lasioptera panici Felt

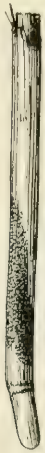

Fig. 18. Black-sheath midge, Lasioptera inustorum Felt. Portion of stem showing blackened sheath. (Original)

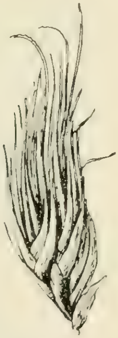

Fig. 19. Siteroptes carnea Bks. Aborted plant of Aristida purpurea. (Original)

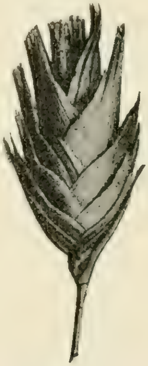

Fig. 20. Asteromyia agrostis O. S. Deformed head of Muhlenbergia. (Author's illustration)

Panicum virgatum

Blackened leaf sheath infested by orange-colored larvae, length of discolored area 3 cm. Fig. 18. Felt '16f, p. 182
Itonid. Black-sheath midge, Lasioptera inustorum Felt

Echinochloa crusgalli

Occurring in fibrous, somewhat decayed stems of the crown or in the lower portions of uninjured stems. Felt '16f, p. 181
Itonid. Grass crown midge, Lasioptera echinochloa Felt

Setaria glauca (bristly fox-tail grass)

Reared from seeds. Dean '10, p. 39
Itonid. Sorghum midge, Contarinia sorghicola Coq

Aristida (triple-awned grass)

Fasciated, reduced leaves, fruit aborted (Bethel in litt.) Banks, '05, p. 140. Fig. 19.
Acarid. Siteroptes carnea Bks.

Muhlenbergia

Fusiform stem enlargement. Fig. 20. Marten '93, p. 155
Itonid. Asteromyia agrostis O. S.

Fusiform stem enlargement, apparently an aborted Asteromyia agrostis gall.
Dipt. Chlorops ingrata Will.

Orange-colored larvae at the base of the leaf sheath and associated with localized, dead areas. Felt '18a, p. 129
Itonid. Lasioptera colorati Felt a2716

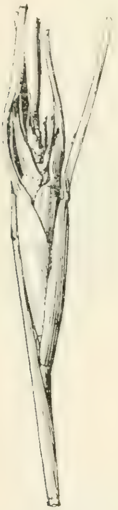

Fig. 21. False spike midge, Asteromyia ? agrostis. Deformed head of Distichlis. (Original)

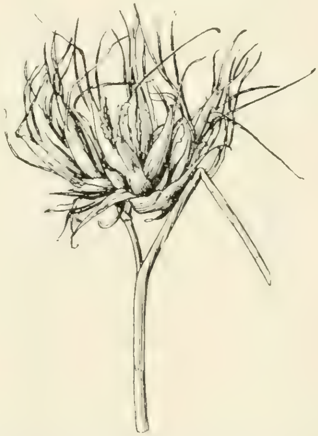

Fig. 22. Sedge Psyllid Livia maculipennis Fitch. Injured head. (Original)

Reared from deformed stems. Howard '95, p. 20
Hym. Joint-worm, Isosomorpha muhlenbergiae How.

Phleum pratensis (timothy)

Boring stems. Web. & Reeves '10
Hym. Western grass stem sawfly, Cephus occidentalis Ril. & Marl.

Injuring stem at base of leaf sheath
Itonid. Cecidomyia sp.

Alopecurus (fox-tail grass)

Reared from seeds. Felt '07e, p. 303
Itonid. Grass seed midge, Itonida setariae Felt

Sporobolus (drop-seed, rush grass)

Deformed heads, Banks, '05, p. 140

Acarid. Siteroptes carnea Banks

Agrostis (bent grass)

Elliptical stem swellings, length 7 to 10 mm, diameter 2 to 3 mm. Howard '95, p. 12

Hym. Grass joint-worm, Isosoma agrostidis How.

Ovipositing on A. alba. Felt '15e, p. 135

Itonid. Dasyneura graminis Felt

Avena (oat)

Reared from cage with aphid-infested seedlings, probably zoophagous. Felt '08e, p. 398

Itonid. Coquillettomyia texana Felt

Reared from cage sown with oats, probably from decaying vegetable matter. Felt '13m, p. 175

Itonid. Prionellus monilis Felt

Reared from oats, possibly fungivorous. Felt '11k, p. 550

Itonid. Mycodiplosis spinosa Felt

Danthonia (wild oat grass)

Probably a stem gall. Felt '09e, p. 287

Itonid. Oat grass midge, Lasioptera danthoniae Felt

Tridens (tall red top)

Reared from stems. Howard '95, p. 21

Hym. Red top borer, Eurytomocharis triodiae How.

Reared from seeds. Dean '10, p. 39

Itonid. Sorghum midge, Contarinia sorghicola Coq.

Eragrostis

Reared from apparently normal or small, swollen stems. Howard '95, p. 21

Hym. Red top borer, Eurytomocharis eragrostidis How.

Probably a stem gall, on E. minor. Felt '11k, p. 483

Itonid. Neolasioptera agrostis Felt

Distichlis (spike grass)

Fusiform stem enlargement produced by a massing of the apical or subapical growth (unpublished note). Fig. 21.

Itonid. False spike midge, ? Asteromyia agrostis O. S.

Aborted, club-shaped shoots with rudimentary lateral leaves, length 3 to 4 cm, diameter 3 to 4 mm, on D. spicata Banks, '05, p. 40

Acarid. Siteroptes carnea Bks., a2896

Ovate, bract-covered gall, length 18 mm, diameter 8 mm. Mall. '18, p. 386

Dipt. Falsespike grass fly, Anthracophaga distichliae Mall.

Poa pratensis (Kentucky blue grass)

Reared from an almost pure blue grass turf (Aldrich in litt.) Felt '15i, p. 149
Itonid. Colpodia sanguinia Felt

Gall unrecognized. Felt '08e, p. 416
Itonid. Colpodia pratensis Felt

Probably inhabiting stems. Howard '95, p. 13
Hym. Grass joint-worm, Isosoma captivum How.
Howard '95, p. 15
Hym. Grass joint-worm, Isosoma maculatum How.

Bromus (brome grass)

Reared from grass stems. Howard '95, p. 11
Hym. Grass joint-worm, Isosoma bromi How.

Reared from grass stems, B. ciliatus. Howard '95, p. 16
Hym. Grass joint-worm, Isosoma bromicola How.

Boring stems. Webs. & Reeves '10
Hym. Western grass-stem sawfly, Cephus occidentalis Ril. & Marl.

Agropyron (couch or quitch grass)

Under leaf sheath. Felt '02, p. 705
Itonid. Hessian fly, Phytophaga destructor Say

Boring stems. Webs. & Reeves '10
Hym. Western grass-stem sawfly Cephus occidentalis Ril. & Marl.

Boring grass stems. Howard '95, p. 12
Hym. Grass joint-worm, Isosoma hageni How.

Fusiform swellings, length 4 cm, diameter 4 mm, composed of reduced leaves and with a central gallery containing a yellowish white larva.
Hym. Grass joint-worm, ? Isosoma sp. a2746

Hordeum (barley)

Under leaf sheaths. Felt '02, p. 705
Itonid. Hessian fly, Phytophaga destructor Say

Reared from stems. Howard '95, p. 18
Hym. Barley joint-worm, Isosoma hordei Harr.

Secale (rye)

Reared presumably from stems. Howard '95, p. 19
Hym. Rye joint-worm, Isosoma secale Fitch
Howard '95, p. 20
Hym. Grass joint-worm, Isosoma fitchii How.

Elymus (wild rye)

Under leaf sheath. Felt '02, p. 705
Itonid. Hessian fly, Phytophaga destructor Say

Probably from stem gall. Felt '15e, p. 90
Itonid. Rhabdophaga elymi Felt

Boring stems. Webs. & Reeves '10

Hym. Western grass-stem sawfly, Cephus occidentalis Ril. & Marl.

Probably inhabiting stems. Howard '95, p. 14

Hym. Rye joint-worm, Isosoma elymi French

Reared from grass stems. Howard '95, p. 16

Hym. Wheat joint-worm, Isosoma tritici Fitch

Cyperaceae (sedges)

Cyperus (sedge)

Rather cylindrical, bud or shoot galls occurring at the very base of the plant, length 4 to 5 mm. Felt '16f, p. 176

Itonid. Sedge bud gall, Hormomyia caudata[1] Felt

Dulichium

Reared from fruit. Felt '12f, p. 241

Itonid. Sedge fruit midge, Thecodiplosis dulichii Felt

Lestodiplosis sp.

Scirpus (bulrush or club rush)

Gall undescribed.

Itonid. Cecidomyia sp.

Juncaceae (rushes)

Deformed fruit

Itonid. Rush fruit midge, Cecidomyia sp.

Juncus (rush)

Infertile, deformed inflorescence, the floral organs being produced as a moderately dense cluster of slender, linear bracts having a length of 3 to 4 cm. Fig. 22. Patch '16, p. 21

Hemip. Sedge Psyllid, Livia maculipennis Fitch

Liliaceae (lily family)

Oakesia

Yellowish blister gall.

Itonid. Cecidomyia sp.

Yucca

Reared from pods. Felt '15e, p. 140

Itonid. Yucca pod midge, Dasyneura yuccae Felt

Reared from stem, probably predaceous. Felt '08e, p. 408

Itonid. Lestodiplosis yuccae Felt

Smilacina (false Solomon's seal)

Deformed berries. Felt '16d, p. 131

Itonid. Asphondylia smilacinae Felt

Root gall. Bishop '11, p. 346

Itonid. Dasyneura smilacinae Bish.

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[1] It is probable that a number of Hormomyias produce bud or shoot galls on various sedges.

Maianthemum

Leaf blister gall, brown, diameter 6 mm.
Itonid. Cecidomyia sp.

Fusiform, monothalamous root gall, length 7 mm, diameter 1.5 mm. Fig. 23. Felt '15h, p. 405
Itonid. Dasyneura torontoensis Felt

Polygonatum (Solomon's seal)

Leaf blister gall, diameter 4 mm. Itonid. Cecidomyia sp.

Smilax (green brier)

Reared from oval blisterlike leaf spots. Pl. 7, fig. 7. Felt '08e, p. 334
Itonid. Smilax blister, Camptoneuromyia rubifolia Felt

Leaf blister gall, diameter 4 mm, S. herbacea
Itonid. Cecidomyia sp.

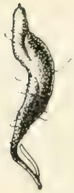

Fig. 23. Dasyneura torontoensis Felt. (Original)

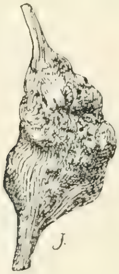

Fig. 24. Cecidomyia sp. Stem gall, a1436. (Original)

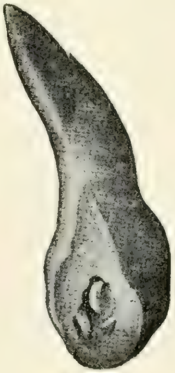

Fig. 25. Orchid Isosoma, Isosoma orchidearum Westw. Infested pseudobulbs. (After Forbes)

Young leaves rolled longitudinally. Felt '15e, p. 147
Itonid. Smilax leaf midge, Dasyneura smilacifolia Felt

Irregularly rounded, abrupt, polythalamous, green stem swellings, diameter 16 mm. Fig. 145, 6. Beutm. '09, p. 143
Cynipid. Smilax stem gall, Diastrophus smilacis Ashm.

Dioscoreaceae (yam)

Dioscorea

Irregular, warty stem gall. Fig. 24. Itonid. Cecidomyia sp.

Iridaceae (Iris family)

Iris (fleur-de-lis)

Oval, green leaf gall, length 12 to 18 mm, diameter 12 mm. Pl. 4, fig. 2. Claus. '18, p. 9
Dipt. Iris leaf gall, Agromyza laterella Zett.

Orchidaceae

Cattleya

Irregular root galls. Felt '15i, p. 89
Itonid. Orchid root gall, Parallelodiplosis cattleyae Moll.

Subspherical or subconical pseudobulbs. Fig. 25. Felt '15i, p. 89
Hym. Orchid Isosoma, Isosoma orchidearum Westw.

Salicaceae (willows and poplars)

Salix (willow)

Key to willow galls

- Fruit galls, p. 29
- Bud galls, p. 29
- Rosette galls, p. 30
- Leaf galls, p. 32
  - Leaf rolls or folds, p. 32
  - Capsule or pocket galls, p. 32
  - Turgid leaf galls, p. 33
- Twig galls, p. 34

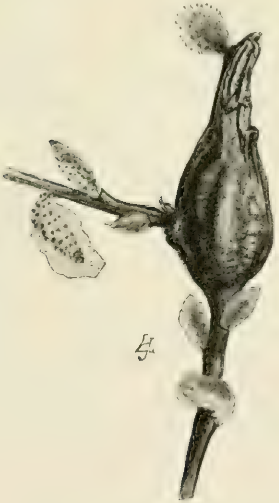

Fig. 26. Beaked willow gall, Phytophaga rigidae O. S. Typical gall. (Author's illustration)

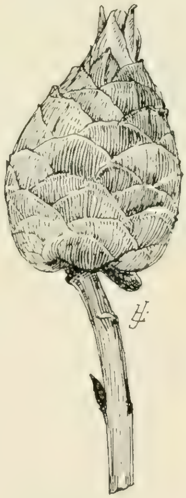

Fig. 27. Pine cone gall, Rhabdophaga strobiloides Walsh. Typical gall. (Author's illustration)

Fruit galls

Enlarged seeds, reddish brown Itonid. Cecidomyia sp.

Bud galls

Apical willow buds blasted. Pl. 12, fig. 3
Itonid. Cecidomyia p.

Apical, fusiform, beaked gall, length 2 cm. Fig. 26, pl. 11, fig. 5. Felt '06a, p. 112
Itonid. Beaked willow gall, Phytophaga rigidae O. S.

Reared from similar gall. Felt '15e, p. 88
Itonid. Rhabdophaga sodalitatis Felt

Reared from apparently normal bud. Felt '15e, p. 97
Itonid. Rhabdophaga latebrosa Felt

Small, conic, apical bud gall. Felt '15e, p. 177
Itonid. Dasyneura gemmae Felt

Fusiform apical bud gall, length 1 cm, diameter 7 mm
Itonid. ? Rhabdophaga sp., a1828

Small bud gall. Felt '15e, p. 100
Itonid. Rhabdophaga gemmae Felt

Ovate, terminal bud gall, diameter 1 cm. Walsh '64, p. 583
Itonid Rhabdophaga gnaphalioides Walsh

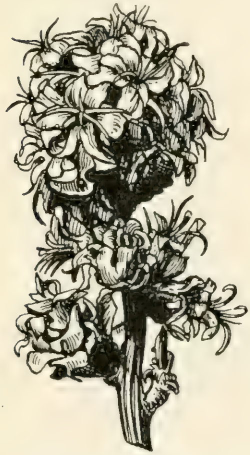

Fig. 28. Phytophaga walshii Felt. Typical cluster of galls. (Original)

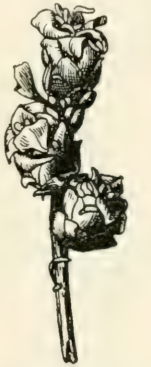

Fig. 29. Clustered willow gall, Rhabdophaga racemi Felt. Typical form. (Original)

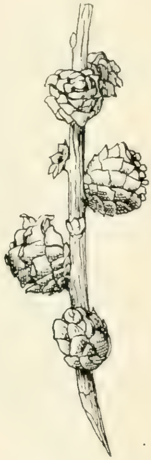

Fig. 30. Clustered willow gall, Rhabdophaga racemi Felt. Provisionally referred to this species. (Original)

Small bud gall. Felt '15e, p. 164
Itonid. Dasyneura californica Felt

Deformed leaf and twig, usually clustered near the apex, whitish green, turning black by winter, on S. fragilis. Chad. '08, p. 145
Acarid. Eriophyes sp.

A mass of small, filamentous structures on leaf or stem, sometimes on distorted buds, on S. nigra. Walsh '66, p. 227
Acarid. Eriophyes aenigma Walsh

Rosette galls

Pine conelike gall, length 2 to 2.5 cm. Fig. 27. Felt '15e, p. 112
Itonid. Pine cone gall, Rhabdophaga strobiloides Walsh

Reared from above gall, ? inquiline. Walsh '64, p. 629

Itonid. Dasyneura annulipes Walsh

Reared from above gall, ? inquiline. Walsh '64, p. 628

Itonid. Dasyneura atricornis Walsh

Reared from above gall, ? inquiline. Walsh '64, p. 626

Itonid. Cecidomyia atrocularis Walsh

Reared from above gall, ? inquiline. Felt '15e, p. 179

Itonid. Dasyneura albovittata Walsh

Reared from above gall, predaceous. Walsh '64, p. 631

Itonid. Lestodiplosis decemmaculata Walsh

Spongy or clustered, rosette gall. Fig. 28. Felt '08e, p. 371

Itonid. Phytophaga walshii Felt

Large, close, pine, conelike gall resembling a slender R. strobiloides gall. Felt '15e, p. 90

Itonid. Rhabdophaga persimilis Felt

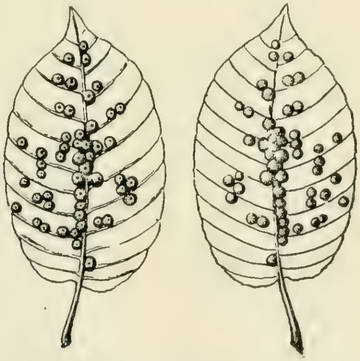

Fig. 31. Willow blister gall, Oligotrophus salicifolius Felt, showing upper and lower surface of leaf. (Original)

Large, open, rosette gall, diameter 1 to 2 cm. Pl. 11, fig. 7. Felt '15e, p. 113

Itonid. Willow-cabbage gall, Rhabdophaga brassicoides Walsh

Reared from above gall, ? inquiline. Walsh '64, p. 630

Itonid. Lestodiplosis septemmaculata Walsh

Reared from above gall, ? inquiline. Ckll. '90, p. 280

Itonid. Rhopalomyia frater Ckll.

Reared from above gall, ? inquiline. Walsh '64, p. 623

Itonid. Dasyneura orbitalis Walsh

Large, loose, rosette gall, length 1 to 2 cm. Felt '15e, p. 111

Itonid. Rhabdophaga rhodoides Walsh

Oval, small, rosette gall, resembling a small R. brassicoides gall. Felt '15e, p. 103

Itonid. Small willow-cabbage gall, Rhabdophaga normaniana Felt

Small, clustered, rosette gall, length 2 cm. Fig. 29, 30. Felt '15e, p. 94
Itonid. Clustered willow gall, *Rhabdophaga racemi* Felt

Leaf galls

Leaf rolls or folds

Fusiform pod or curled leaves, length 10 mm. Pl. 10, fig. 2. Felt '15e, p. 169
Itonid. Willow-pod midge, *Dasyneura salicifolia* Felt

Closely rolled, terminal leaves. Felt '15e, p. 93
Itonid. *Rhabdophaga plicata* Felt

One or two narrow, longitudinal, yellowish green or brown upward folds opening below, on S. *longifolia*. Chad. '08, p. 145
Acarid. *Eriophyes salicicola* Garm.

Small thickenings or inrollings of the leaf margin, green, scattered or coalescent, on S. *alba*. Chad. '06, p. 144
Acarid. *Eriophyes* sp.

Irregular, more or less crenulate midrib fold, length 7 mm. Utah
Acarid. *Eriophyes* sp. a2759

Capsule or pocket galls

Very small, crimson red, pocket galls or semicapsules, on S. *amygdaloides*. Chad. '08, p. 144
Acarid. *Eriophyes* sp.

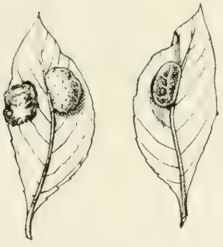

Fig. 32. Willow pea gall, *Pontania pisum* Walsh. (Original)

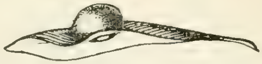

Fig. 33. Willow apple gall, *Pontania pomum* Walsh, side view. (Original)

Small, irregular, serrate, roughened, pocket galls or semicapsules, green or red, usually on upper surface, on S. *alba*, *balsamifera*, *discolor* and *rostrata*. Pl. 16, fig. 8. Chad. '08, p. 144
Acarid. *Eriophyes* sp.

Purple or pale green capsule gall on both surfaces of the leaf, on S. *cordata*. Chad. '08, p. 145
Acarid. *Eriophyes* sp.

Irregularly hemispherical, greenish yellow, pocket gall on either surface, on S. *nigra*. Chad. '08, p. 146
Acarid. *Eriophyes semen* Walsh

Small and very crowded, pocket galls on leaves of S. *nigra*. Chad. '08, p. 146
Acarid. *Eriophyes* sp.

Small, irregular, spherical galls on upper surface of leaves. Chad. '08, p. 146
Acarid. *Eriophyes* sp.

Filamentous structures on leaf. Walsh '66, p. 227

Acarid. Eriophyes aenigma Walsh

Turgid leaf galls

Smooth, flattish, fleshy, sessile, yellowish green, on both surfaces of the leaf, length 6 to 12 mm, on S. humilis. Pl. 3, fig. 8. Walsh '66, p. 257

Hym. Pontania desmodioides Walsh

Yellowish, red-spotted, flattened gall, diameter 2 to 3 mm. Fig. 31. Felt '10d, p. 354

Itonid. Willow blister gall, Oligotrophus salicifolius Felt

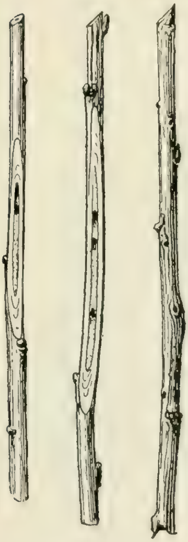

Fig. 34. Rhabdophaga caulicola Felt. Infested stems, two sectioned. (Original)

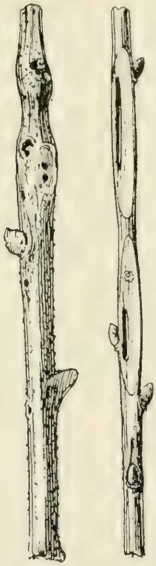

Fig. 35. Sackenomyia packardi Felt. Infested twig and another in section showing characteristic galleries. (Original)

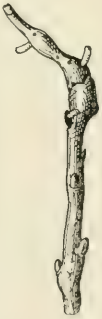

Fig. 36 Sackenomyia porterae Ckll. Infested twig. (Original)

Subconical, truncate, greenish yellow, lipped gall, diameter 2 mm. Pl. 10, fig. 6. Walsh '64, p. 606

Itonid. Willow lipped gall, Hormomyia verruca Walsh

Apparently reared from the same gall. Felt '07a, p. 108

Itonid. Clinorhyncha filicis Felt

Conical, monothalamous, petiole gall, length 6 to 9 mm, diameter 3 to 4 mm. Rohw. '15, p. 213

Hym. Euura cosensii Rohw.

Ovate, fleshy, reddish, willow leaf galls in parallel rows on either side of the midrib, brownish red, beneath white, tinged with purple, length 7 to 10 mm, on S. fragilis. Felt '06b, p. 638

Hym. Pontania hyalina Nort.

Subspherical, pealike, hollow, pale yellowish green gall on under side of leaf, usually on a side vein, diameter 5 to 7 mm. Fig. 32, pl. 3, fig. 9. Felt '06b, p. 637

Hym. Willow pea gall, Pontania pisum Walsh

Rounded or ovate, fleshy, yellowish green, usually rosy-cheeked gall, projecting slightly on the upper surface, diameter 12 mm. Fig. 33. Felt '06b, p. 636

Hym. Willow apple gall, Pontania pomum Walsh

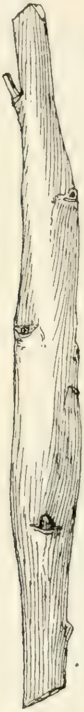

Fig. 37. Rhabdophaga podagrae Felt. Swollen twig. (Author's illustration)

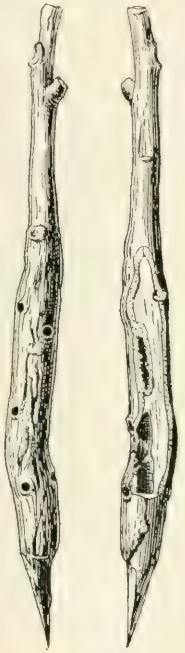

Fig. 38. Rhabdophaga cornuta Walsh. Swollen twig and one in section showing galleries. (Original)

Very similar gall, prominent on both surfaces of the leaf, on S. petiolaris. Cosens, '17, p. 18

Hym. Pontania petiolaris Rohw.

Fusiform, mid vein swelling, length 3 mm, diameter .75 mm. Cosens in litt.

Hym. ? Euura sp.

Twig galls

Reared from twigs, gall unrecognized. Felt '07e, p. 297

Itonid. Asphondylia salictaria Felt

Larvae in subcortical cells; no swelling. Felt '15e, p. 168

Itonid. Dasyneura corticis Felt

Reared from apparently unmodified branches and limbs of Salix fendleriana. Felt '16f, p. 191
Itonid. Phytophaga timberlakei Felt

Slender twigs slightly enlarged. Felt '08e, p. 370
Itonid. Phytophaga americana Felt

Slender twigs slightly enlarged. Fig. 34. Felt '08e, p. 370
Itonid. Phytophaga caulicola Felt

Slender twigs slightly enlarged. Felt '15e, p. 103
Itonid. Rhabdophaga caulicola Felt

Slender twigs slightly enlarged. Fig. 35. Felt '09e, p. 290
Itonid. Sackenomyia packardi Felt

Slender twigs slightly enlarged. Fig. 36. Ckll. '04, p. 155
Itonid. Sackenomyia porterae Ckll.

Twigs probably hardly enlarged. Felt '08e, p. 371
Itonid. Phytophaga perocculta Ckll.

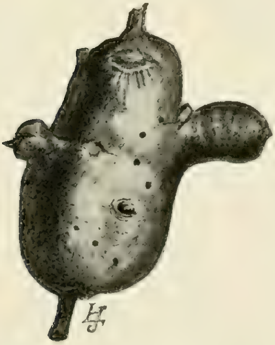

Fig. 39. Willow potato gall, Rhabdophaga batatus Walsh. Typical enlargement. (Author's illustration)

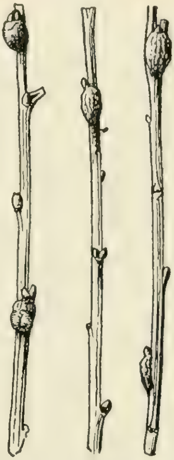

Fig. 40. Scarred willow gall, Phytophaga tumidosae Felt. (Original)

Inconspicuous, knot or twig enlargement. Felt '08e, p. 358
Itonid. Phytophaga latipennis Felt

Twig uniformly enlarged, gall 5 to 7 cm long. Fig. 37. Felt '15e, p. 109
Itonid. Rhabdophaga podagrae Felt

Gall similar to above, cells in wood. Fig. 38. Felt '15e, p. 110
Itonid. Rhabdophaga cornuta Walsh

Gradual enlargement of the twig, usually extending partly around it and several near each other, polythalamous, length 1 to 3 cm. Rohw. '09, p. 15
Hym. Euura nodus Walsh

Gradual twig enlargement, length 30 mm, diameter 7 to 10 mm, on S. luteosericea. Rohw. '09, p. 16
Hym. Euura macgillivrayi Rohw.

Twigs enlargement, abrupt basally, resembles that of E. macgillivrayi Rohw. '09, p. 24.

Hym. Euura propinquus Rohw.

A mass of filamentous structures on the stem. Walsh '66, p. 227

Acarid. Eriophyes aenigma Walsh

Apical, fusiform, beaked gall, length 2 cm. Fig. 26, pl. 11, fig. 5. Felt '06a, p. 122

Itonid. Beaked willow gall, Phytophaga rigidae O. S.

Reared from similar gall. Felt '15e, p. 88

Itonid. Rhabdophaga sodalitatis Felt

Twigs irregularly enlarged, galls 1 to 3 cm long. Pl. 12, fig. 2. Felt '15e, p. 96

Itonid. Rhabdophaga salicis Schr.

Twig irregularly enlarged, gall 1 to 3 cm long, the stems between the buds dwarfed, giving a " wheat ear " appearance. Pl. 12, fig. 4. Felt '15e, p. 88

Itonid. Wheat ear gall, Rhabdophaga triticoides Walsh

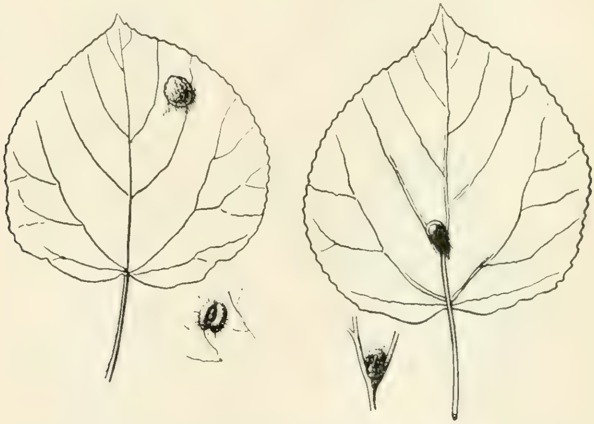

Fig. 41. Cecidomyia sp., two types of subglobular galls on poplar leaves, the true producers unknown. (Original)

Irregular, ovoid or subglobular galls, diameter 1 to 2 cm. Fig. 39. Felt '15e, p. 105

Itonid. Willow potato gall, Rhabdophaga batatus Walsh

Reared from same gall. Felt '15e, p. 92

Itonid. Rhabdophaga ramuscula Felt

Reared from same gall, dried. Felt '08e, p. 421

Itonid. Asynapta saliciperda Felt

Nodular gall at base of twigs, length 8 mm. Pl. 11, fig. 9. Felt '15e, p. 91

Itonid. Nodule willow gall, Rhabdophaga nodula Walsh

Irregularly elongated, ovate, reddish brown, spongy twig gall, 10 to 20 mm long. Pl. 3, fig. 7. Rohw. '09, p. 12

Hym. Willow egg gall, Euura ovum Walsh

Subglobose galls, the surface scarred, diameter 4 mm. Fig. 40. Felt '08e, p. 370

Itonid. Scarred willow gall, Phytophaga tumidosae Felt

Subglobular lateral gall with dead area on one side, diameter 9 mm. Pl. 11, fig. 8. Felt '15e, p. 100

Itonid. Rhabdophaga globosa Felt

Abrupt, elongate twig swelling, length 10 to 35 mm, height 8 to 11 mm, width 7 to 12 mm, on S. rostrata. Rohw. '09, p. 18

Hym. Euura bebbianae Rohw.

Lateral, monothalamous twig enlargements 4 to 9 mm long, 3 to 4 mm wide. Rohw. '09, p. 10

Hym. Euura orbitalis Nort.

Aborted, lateral, pale, roughened twig swellings, length 10 mm, width 7 mm. Rohw. '09, p. 11

Hym. Euura cooperae Ckll.

Globose, constricted twig swellings, diameter 1.5 cm. Chitt. '00, p. 68

Coleop. Agrilus politus Say

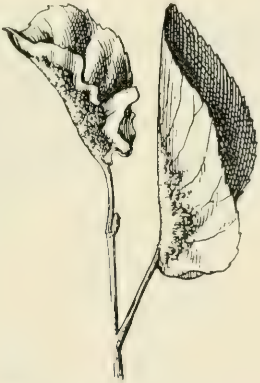

Fig. 42. Cecidomyia sp., the larvae producing a midvein fold. (Original)

Irregularly ovate twig swelling, length 4 cm, diameter 3 cm. Felt & Joutel '04, p. 73

Coleop. Saperda concolor Lec.

Irregular, branch and trunk swellings, mostly on branches or smaller stems produced by transverse galleries just under the bark. Felt '06b, p. 103

Coleop. Mottled willow borer, Cryptorhynchus lapathi Linn.

Populus (poplar)

Irregular, greenish, subtriangular, monothalamous petiole or twig galls, length 1 cm, diameter .7 cm, on cottonwood

Itonid. Cecidomyia sp. a1513

Globose, purplish, sometimes adherent masses of deformed flowers, diameter 1.5 cm, from Mojave desert

Acarid. Eriophyes sp. a2761

Irregular, monothalamous blister leaf gall. Stebb. '10, p. 9

Itonid. Cecidomyia sp. (irregularis Stebb.)

Subglobular leaf gall. Felt '15e, p. 206

Itonid. Rhizomyia absobrina Felt

Variable, subglobular leaf gall.[1] Fig. 41. Felt '08e, p. 394

Itonid. Dicrodiplosis populi Felt

Apparently from the same gall, probably predaceous. Felt '08e, p. 409

Itonid. Lestodiplosis globosa Felt

Subglobular leaf gall, diameter 3 to 4 mm. Felt '08e, p. 400

Itonid. Mycodiplosis populifolia Felt

Roundly conical leaf gall, diameter 3 mm, on P. candicans, balm-of-Gilead. Pl. 7, fig. 2.

Itonid. Cecidomyia sp.

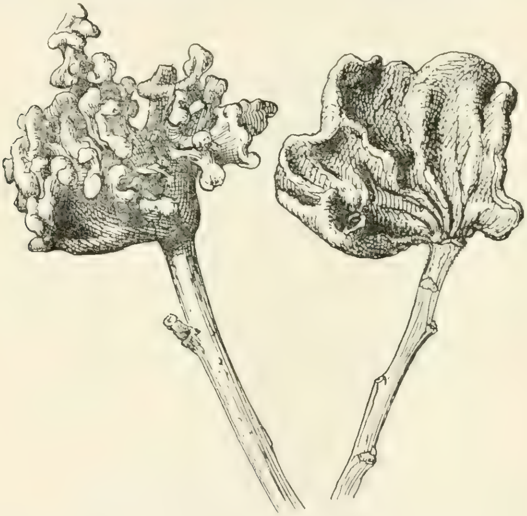

Fig. 43. Vagabond poplar gall, Pemphigus vagabundus Walsh. (Original)

Irregular, tumid gall at base of leaf, similar to that of Lasioptera vitis

Itonid. Cecidomyia sp.

Subglobular galls, diameter 6 to 12 mm, occur in June at the base of cottonwood leaves. Felt '06b, p. 636

Aphid. Pemphigus populicaulis Fitch

Marginal leaf roll, length 1 cm, predaceous. Felt '08e, p. 408

Itonid. Lestodiplosis populifolia Felt

Brown, marginal leaf roll, length 2.5 cm, several larvae in each

Itonid. Cecidomyia sp.

Both edges of the leaf inrolled toward each other, on the upper surface. Chad. '08, p. 138

Acarid. Eriophyes sp.

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[1] There are a series of these globose or conical galls on poplar leaves which are apparently produced by several species of gall midges.

Longitudinal fold galls dwarfing the leaf. Fig. 42.
Itonid. Cecidomyia sp.

Light red, cockscomb-like gall developing on the upper surface from the midvein. Pack. '90, p. 472
Aphid. Pemphigus populi-venae Fitch

A rib gall on the main vein, on P. heterophylla. Chad. '08, p. 137
Acarid. ? Eriophyes sp.

Irregularly folded, convolute mass of foliage some 2 inches in diameter, frequently apical. Fig. 43. Felt '06b, p. 635
Aphid. Vagabond gall, Pemphigus vagabundus Walsh

Irregular, pinkish and light green, pod-shaped shelters formed by apposed leaf edges and containing numerous white plant lice, length 2.5 to 3 cm, diameter 1 cm, on Lombardy poplar.
Aphid. Purse leaf gall, Pemphigus affinis Kalt.

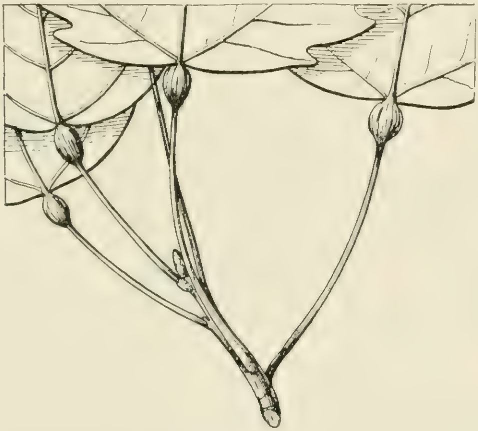

Fig. 44. Ribbed petiole gall, Ectoedemia populella Busck. (Original)

An olive buff to olive brown erineum or dimple, slightly indented on the under side of the leaf, diameter 6.5 mm or less, one to eight on a leaf. Chad. '08, p. 137
Acarid. Eriophyes sp.

Dimples "on the leaves on the upper side, lined with spherical granules, reddish or greenish in color." The galls are green, 3 or 4 on a leaf, diameter 2 to 3 mm, possibly identical with the preceding. Chad. '08, p. 137
Acarid. Eriophyes sp.

White to dark brown erineum or dimple gall on the under side of the leaf of P. grandidentata. Chad. '08, p. 136
Acarid. Eriophyes sp.

A small, green or red, pocket gall on the upper side of the leaf of P. grandidentata. Chad. '08, p. 136
Acarid. Eriophyes sp.

A large, deep, sharply defined dimple, green, orange yellow within, diameter 4 to 12 mm, convex toward the upper surface of the leaf, on P. nigra var. italica. Chad. '08, p. 137

Acarid. Eriophyes sp.

Oval, somewhat elongate galls with transverse openings occur near the middle of the leaf petioles of cottonwood, the latter part of the summer. Felt '06b, p. 635

Aphid. Poplar leaf stem gall, Pemphigus populitransversus Ril.

Globose petiole gall at the base of the leaf and with a transverse mouth. Pack. '90, p. 470

Aphid. Basal leaf gall, Pemphigus populicaulis Fitch

Subglobular, distinctly ridged, monothalamous, petiole gall at the base of the leaf, diameter 5 to 7 mm. Fig. 44. Busck '07, p. 98

Lepid. Ribbed petiole gall, Ectoedemia populella Busck

An irregular, large stem and petiole deformation. Pl. 16, fig. 3. Chad. '08, p. 138

Acarid. Eriophyes populi Nal.

Oval twig gall, length 3 to 4 cm, diameter 3 cm. Felt and Joutel, '04, p. 368

Coleop. Saperda populnea Linn.[1]

Irregular, branch and trunk swellings, mostly on branches or smaller stems, produced by transverse galleries just under the bark. Felt '06b, p. 103

Coleop. Mottled willow borer, Cryptorhynchus lapathi Linn.

Irregularly oval swellings on the smaller twigs, length 3 mm. Pl. 4, fig. 3. Felt '06b, p. 634

Dipt. Poplar twig gall fly, Agromyza schineri Giraud

Irregular, subconical twig or petiole gall, length 1 cm

Itonid. Cecidomyia sp.

Oval, white cocoons on twigs. Felt '15e, p. 102

Itonid. Rhabdophaga populi Felt

In decaying wood. Felt '11k, p. 476

Itonid. Kronomyia populi Felt

Myricaceae (sweet gale family)

Myrica cerifer (wax myrtle)

Bud galls. Beutm. '07d, p. 306

Itonid. Itonida myricae Beutm.

Myrica asplenifolia (sweet fern)

Fleshy vein folds, length 2 to 4 mm. Fig. 45. Felt '07a, p. 159

Itonid. Sweet fern midge, Janetiella asplenifolia Felt

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[1] Prof. T. D. A. Cockerell has described the gall of S. lesquereuxi on Populus lesquereuxi from the miocene shales of Florissant, *see* Proc. U. S. Nat. Mus., no. 2146, p. 105, 1916.

Myrica carolinensis (bayberry)

Bayberry leaves badly dwarfed and deformed. Pl. 15, fig. 6. Thompson '16, p. 80

Acarid. Eriophyes sp.

Juglandaceae (walnut family)

Juglans cinerea (butternut)

Folded, appressed, crinkled leaves

Itonid. Cecidomyia sp.

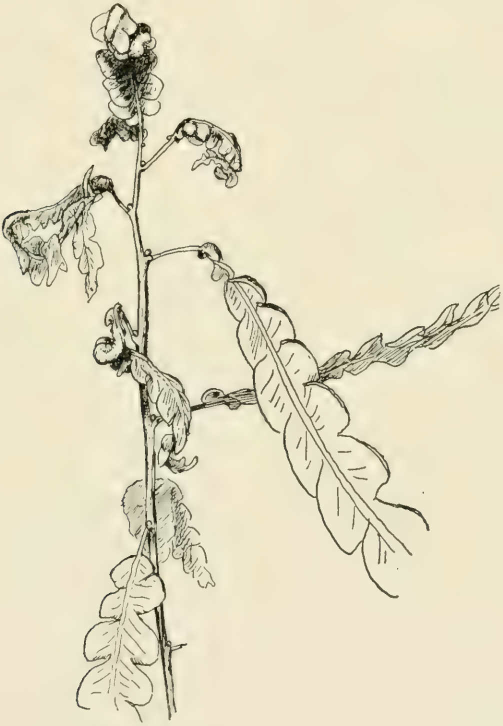

Fig. 45. Sweet fern midge, Janetiella asplenifolia Felt. Deformed leaves. (Author's illustration)

A brown, velvety erineum surrounding the leaf stalks or on the main veins, causing a swelling and bending of the stalk or vein; also on black walnut. Chad. '08, p. 135

Acarid. Eriophyes sp.

A button-shaped, pocket gall usually on the upper side of the leaf, green or lighter colored, beneath widely opened and lined with whitish or brownish hairs. Chad. '08, p. 135

Acarid. Eriophyes sp.

Juglans nigra (black walnut)

An erineum and blister on the leaf. Chad. '08, p. 135

Acarid. Eriophyes tristriatus Nal.

A green warty, pocket gall on either surface, chiefly the upper, diameter 2 to 5 mm. Chad. '08, p. 136

Acarid. Eriophyes sp.

Carya (hickory)

Key to hickory galls

Occurring under the bark, p. 42
Leaves rolled or folded, p. 42
Axillary vein galls, p. 42
Leaf blisters, p. 42
Cylindric leaf galls, p. 42
Conical leaf galls, without a distinct orifice, p. 43
Conical or globose leaf galls with distinct orifice and containing aphids, p. 43
Globose leaf galls (other than those described above), smooth, or nearly so, p. 46
Globose leaf galls — hairy, p. 46
Midrib or vein gall, p. 47
Leaf folds and ridges, p. 47
Petiole or twig galls, p. 47
Occurring on leaf, producing no gall, p. 47
Swellings in husks, p. 49

Occurring under bark

Under dying, sappy bark.

Itonid. Cecidomyia sp.

Under decaying bark. Felt '13m, p. 205

Itonid. Miastor americana Felt

Leaves rolled or folded

Leaf edges narrowly inrolled, especially toward the base, on C. pecan (possibly the same species has been recorded by Thompson from Massachusetts). Pl. 15, fig. 4. Chad. '08, p. 152

Acarid. Eriophyes sp.

"Deformation and folds on the leaf," on C. alba. Chad. '08, p. 135

Acarid. Eriophyes sp.

Axillary vein galls

Small, axillary galls in the angles of the lateral veins. Wells '15, p. 43

Acarid. Eriophyes sp.

Leaf blisters

Irregular, dull greenish or black-margined, slightly nippled, diameter 3 mm. Pl. 5, fig. 8.

Itonid. Cecidomyia sp.

Cylindric leaf galls

Greenish or black, cylindric, length 4 to 5 mm, diameter 1 mm. Fig. 46. Felt '09e, p. 293

Itonid. Hickory tube gall, Caryomyia tubicola O. S.

Similar to preceding but longer, curved and tapering, length 5 to 7 mm, diameter 1.4 mm, light green basally, dark brown or black apically. Wells '15, p. 53

Itonid. Cecidomyia sp.

Slender, tapering, suberect, light greenish with flaring, dentate base, length 5 to 8 mm, basal diameter 2.5 to 3.5 mm. Wells '15, p. 47

Itonid. Cecidomyia sp.

Greenish, hairy, length 5 mm, beaked, on C. alba
Caryomyia sp., a2526

Conical leaf galls, without a distinct orifice

Base subglobular, a long, slender apical process, greenish to reddish brown, length 3 to 4 mm, occurs in groups on midrib of bitternut hickory. Pl. 6, fig. 2, 3. Osten Sacken '62, p. 192
Itonid. Hickory seed gall, Caryomyia caryaecola O. S.[1]

Conical, nearly symmetrical, thin-walled, small, green or red tinted, length 2 mm. Felt '09e, p. 293
Itonid. Conical hickory gall, Caryomyia sanguinolenta O. S.

Narrowly conical, light green midrib or vein gall, length 5 mm, diameter 1 mm.
Itonid. Caryomyia sp.

Conical or globose leaf galls with distinct orifice and containing aphids

Galls more or less conical above and beneath, opening on the upper surface, both nipples surrounded at the apex by a fringe of long filaments, walls thin, more or less transparent, diameter 5 to 12 mm, height 4 to 6 mm. Perg. '04, p. 190
Aphid. Phylloxera caryaeseptem Shim.

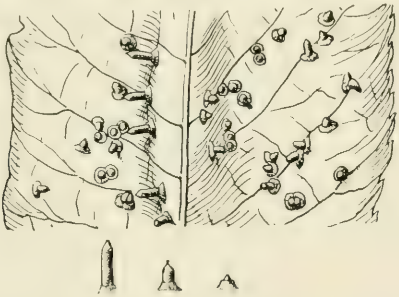

Fig. 46. Hickory tube gall, Caryomyia tubicola O. S. Group of galls on under side of leaf and several stages shown below in profile. (Original)

Similar to the preceding, with both cones very much elongated, slender and toothlike, length of cones 3 to 8 mm, diameter 2 to 4 mm. Perg. '04, p. 190
Aphid. Phylloxera caryaeseptem Shim. var. perforans Perg.

Galls conical above, opening on the upper surface, flat beneath, splitting into several bracts when mature, with slender filaments at the center beneath, walls papery, more or less transparent, diameter 5 mm. Perg. '04, p. 194
Aphid. Phylloxera caryaefoliae Fitch

Galls similar to P. caryaeseptem, opening on upper surface, smaller, more flattened but slightly convex above and beneath, opening round or oval, surrounded by short, recurved, pubescent bracts, a minute, closed nipple beneath, diameter 3 to 6 mm, height 2 to 3 mm. Perg. '04, p. 197
Aphid. Phylloxera picta Perg.

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[1] Schizomyia caryaecola Felt was supposed to have been reared from this gall. The one or two specimens obtained were probably accidental.

Galls smaller though similar to P. picta, opening on upper surface, more convex and often with a slight depression above, no opening above before maturity, a minute, closed nipple beneath, diameter 3 to 6 mm, height 2 to 3 mm. Perg. '04, p. 189

Aphid. Phylloxera intermedia Perg.

Gall convex, opening on the under surface, the walls papery, more elevated above than beneath, with a reddish or crimson fovea or dimple above, varying in depth; the orifice beneath small and surrounded by a fringe of short, flaring bracts, diameter 3 to 5 mm, height 1 to 3 mm. Perg. '04, p. 200

Aphid. Hickory button gall, Phylloxera foveola Perg.

Gall concave above, with orifice on under surface, the walls papery, convex beneath, the nipple formed of rather long, slender filaments, the depression above as well as the surface beneath, including the filaments, with long, white hairs, diameter 3 to 6 mm, height 2 to 3 mm. Perg. '04, p. 203

Aphid. Phylloxera pilosula Perg.

Gall small, the walls papery, slightly convex above, more prominent beneath, usually with a small, shallow depression toward one side, above, nipple short, without bracts, the orifice beneath, more or less oval and fringed with short pubescence, diameter 1.5 mm. Perg. '04, p. 205

Aphid. Phylloxera deplanata Perg.

Gall medium, the walls papery, slightly convex above and beneath with a short nipple, having a rounded orifice surrounded by a burlike fringe of many filaments, diameter 3.8 to 6.2 mm, height 3 mm. Perg. '04, p. 208

Aphid. Phylloxera depressa Shim.

Gall medium, opening on the under surface, walls papery, quite flat, above, with a dimpled depression, the opening beneath round and with a downy orifice, diameter 1.5 mm, height 3 to 4 mm. Perg. '04, p. 209

Aphid. Phylloxera foveata Shim.

Gall medium, walls papery, convex and considerably elevated above and more prominent than beneath, rather hard, smooth and shining, the orifice beneath round and closed; resembles the gall of P. caryaesemen, diameter .6 to 2 mm. Perg. '04, p. 210

Aphid. Phylloxera minima Shim.

Gall minute, walls papery, red, more convex and more prominent above than beneath, with a dimpled depression, the nipple short and the orifice beneath surrounded by short, hairy bracts, diameter .3 to 2 mm, height .2 to 5 mm. Pl. 14, fig. 8. Perg. '04, p. 211

Aphid. Phylloxera caryaesemen Walsh

Gall medium, walls papery, conical above and much more prominent than the convex under surface, the nipple short with the oval orifice beneath, fringe with short hairs, diameter 1.5 mm. Pl. 14, fig. 5. Perg. '04, p. 214

Aphid. Phylloxera caryaefallax Ril.

Gall large, fleshy, convex on both surfaces, more prominent on the lower, the circumference above buttonlike, with a more or less sharply defined edge either above or sunken beneath the surface of the leaf, nipple short, surrounded by short bracts, the orifice beneath round, diameter 3 to 11 mm, height 1.6 to 3.4 mm. Pl. 14, fig. 7. Perg. '04, p. 217

Aphid. Phylloxera rimosalis Perg.

Gall subglobose, walls fleshy, about equally prominent above and beneath, without a nipple, the orifice beneath a transverse slit, diameter 8 to 14 mm, height 2 to 4 mm. Perg. '04, p. 220

Aphid. Phylloxera caryaescissa Ril.

Gall subglobose, walls fleshy, somewhat more prominent above than beneath, without a nipple, the orifice beneath an elongate slit, size one-half to one-third the extreme diameter of P. caryaecaulis. Fig. 47, pl. 14, fig. 6. Perg. '04, p. 222

Aphid. Phylloxera caryaeglobuli Walsh

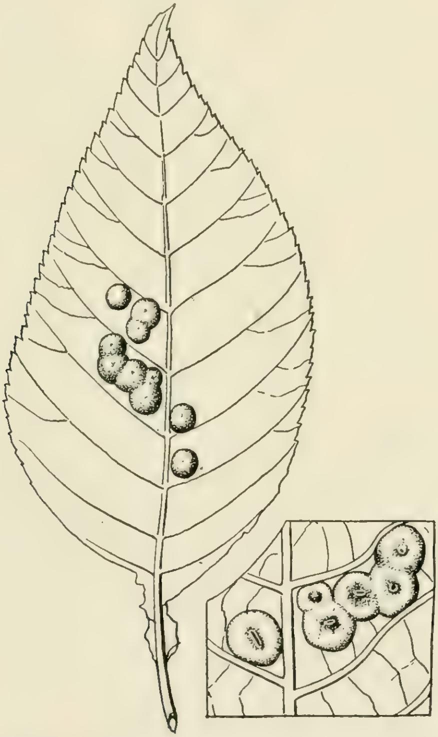

Fig. 47. Phylloxera caryaeglobuli Walsh. Group of galls with small group enlarged and showing orifice on under surface. (Original)

Gall subglobose, walls fleshy, about equally prominent on both leaf surfaces, conical beneath, ending in a short nipple and splitting into several stout bracts, diameter 3 to 7 mm, height 2 to 5 mm. Perg. '04, p. 225

Aphid. Phylloxera conica Shim.

Gall flat above, walls fleshy, either flush with or sunken below the leaf surface, globular or pyriform beneath and more or less constricted at the base, with or without a distinct nipple which, when present, splits into several bracts, diameter and height 5 to 10 mm. Pl. 14, fig. 4. Perg. '04, p. 228

Aphid. Phylloxera caryae-avellana Ril.

Gall medium, walls fleshy, quite flat above, usually with a more or less distinct median depression, prominent and conical beneath, not constricted at the base, the nipple distinct, surrounded by short bracts, diameter 2.5 mm, height 3 to 4 mm. Perg. '04, p. 232

Aphid. Phylloxera symmetrica Perg.

Gall large, walls fleshy, more or less irregular, convex above, more prominent and conical beneath, splitting at maturity into several very long bracts, diameter 5 to 10 mm, height 3 to 8 mm. Perg. '04, p. 235

Aphid. Phylloxera notabilis Perg.

Gall large, walls fleshy, globular, projecting about equally on both leaf surfaces, nipple short, with four to five short, stout pubescent bracts surrounding the orifice, curving outwards when old, size variable. Perg. '04, p. 236

Aphid. Phylloxera globosa Shim.

Gall large, walls fleshy, pedunculate and more or less elongated, suspended from the under surface by a slender petiole, quite sticky when fresh, splitting at the apex into several long filaments. Perg. '04, p. 238

Aphid. Phylloxera caryaegummosa Ril.

Globose leaf galls (other than those described above) smooth or nearly so

Nearly smooth, thin-walled, yellowish green or brown, sparsely haired, usually with a slight nipple, diameter 2 mm. Pl. 6, fig. 7. Felt '09e, p. 293

Itonid. Hickory leaf gall, Caryomyia caryae O. S.

Reared from the same gall, probably inquiline. Osten Sacken '62, p. 191

Itonid. Cecidomyia caryae O. S.

Thin-walled, depressed, yellowish green or brown, diameter 2 to 2.5 mm. Pl. 6, fig. 9. Felt '09e, p. 292

Itonid. Caryomyia consobrina Felt

Thin-walled, probably similar to the above. Felt '08e, p. 338

Itonid. Caryomyia arcuaria Felt

Thin-walled, without the nipple of Caryomyia caryae, with a yellowish pubescence, diameter 2 to 4 mm. Felt '09e, p. 292

Itonid. Caryomyia similis Felt

Thin-walled, globose, slightly depressed, with a slight nipple, diameter 3 to 4 mm.

Itonid. Cecidomyia sp.

Thick-walled, yellowish green or brown, diameter 4 to 5 mm. Pl. 6, fig. 1. Felt '09e, p. 292

Itonid. Caryomyia antennata Felt

Thick-walled, irregularly ovate, granulate, a slight nipple, diameter 2 to 3 mm.

Itonid. Cecidomyia sp.

Thin-walled, with a false chamber at the apex, diameter 2 to 3 mm. Felt '09e, p. 292

Itonid. Caryomyia inanis Felt[1]

Globose leaf galls — hairy

Thick-walled, brownish or reddish brown, hairs rather short, curly, diameter 6 to 7 mm. Beutm. '07, p. 393

Itonid. Hickory peach gall, Caryomia persicoides Beutm.

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[1] Wells '15 has characterized several variations in hickory galls having a false apical chamber. They may prove specifically distinct.

Possibly reared from the above gall. Felt '15e, p. 108

Itonid. Rhabdophaga hirticornis Felt

Reared from several Carya galls, probably inquiline. Felt, '07a, p. 141

Itonid. Parallelodiplosis caryae Felt

Thin-walled, rust-red, hairs long, straight, diameter 2 to 4 mm. Pl. 6, fig. 4. Felt '09e, p. 293

Itonid. Hickory onion gall, Caryomyia holotricha O. S.

Gall similar to the above, the midge probably inquiline. Felt '08e, p. 401

Itonid. Mycodiplosis holotricha Felt

Thin-walled, long-haired, melon-shaped, diameter 2 to 3 mm. Pl. 6, fig. 8. Felt '08e, p. 388

Itonid. Caryomyia thompsoni Felt

Thin-walled, with long, brown hairs, globose, diameter 3 to 4 mm, nipple distinct, long on some.

Itonid. Caryomyia sp.

Midrib or vein gall

A rounded, irregular, pale yellowish, hard swelling, 12 mm long. Osten Sacken '62, p. 193

Itonid. Caryomyia cynipsea O. S.[1]

Leaf folds and ridges

Galls either on the main rib or transverse veins, yellowish green, brownish or purplish, two or more confluent, length 6 to 14 mm, diameter 2 to 3 mm. Pergande '04, p. 239

Aphid. Phylloxera caryae-venae Fitch

Globular or irregular, terminating in a toothlike nipple and occurring on tender twigs, petioles or ribs of leaves, often confluent, smooth, diameter 2 to 8 mm. Pergande '04, p. 251

Aphid. Phylloxera perniciosa Perg.

Reniform, petiole or midrib gall, a transverse slit dividing the gall into two halves, diameter 2 to 15 mm. Pergande '04, p. 257

Aphid. Phylloxera caryaeren Ril.

Occurring on leaf, producing no gall

An irregular, yellowish, brown-margined elevation, diameter 3 mm, larva surrounded by a viscid secretion. Osten Sacken '62, p. 193

Itonid. Sticky leaf spot, Caryomyia glutinosa O. S.[1]

Petiole or twig galls

Globular or oval, often more or less conical, spiny or smooth, according to the tree on which they grow, and more or less confluent, diameter 5 to 25 mm. Pergande '04, p. 244

Aphid. Hickory gall aphid, Phylloxera caryaecaulis Fitch

Globular, densely covered with long, fleshy filaments, diameter 5 to 15 mm. Pergande '04, p. 247

Aphid. Phylloxera spinuloides Perg.

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[1] The reference of this species to Caryomyia is provisional.

Medium, growing in larger or smaller clusters and apparently deformations of flower and leaf buds, splitting when mature into four or more broad bracts, surface smooth, diameter 3 to 15 mm. Pergande '04, p. 248

Aphid. Phylloxera devastatrix Perg.

Medium, smooth, growing in clusters, usually with a short, stout nipplelike projection on one side, diameter 5 to 10 mm. Pergande '04, p. 249

Aphid. Phylloxera georgiana Perg.

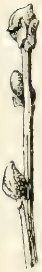

Fig. 48. Cecidomyia sp. Bud gall on Corylus, a1737. (Original)

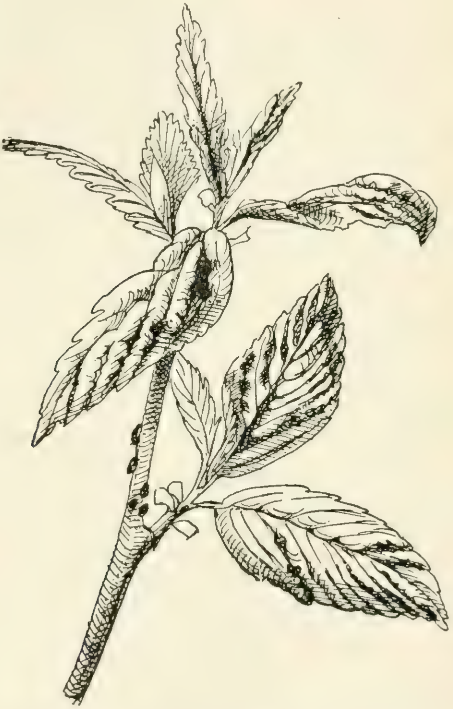

Fig. 49. Spiny witch-hazel gall aphid, Hamamelistes spinosus Shim. Pseudo galls on birch leaves. (After Pergande)

Large, oval, smooth, growing on the petioles, a slight, central depression covered with short hairs, length 20 mm, diameter 10 mm. Pergande '04, p. 250

Aphid. Phylloxera subelliptica Shim.

Globular or irregular, terminating in a toothlike nipple and occurring on tender twigs, petioles or ribs of leaves, often confluent, smooth, diameter 2 to 8 mm. Pergande '04, p. 251

Aphid. Phylloxera perniciosa Perg.

Reniform, petiole or midrib gall, a transverse slit dividing the gall into two halves, diameter 2 to 15 mm. Pergande '04, p. 257

Aphid. Phylloxera caryaeren Ril.

Swellings in husks

Irregular swellings in the husks, produced by pale reddish larvae. Osten Sacken '70, p. 53

Itonid. Hickory husk midge, Caryomyia nucicola O. S.[1]

Betulaceae (birch family)

Corylus (hazelnut)

Globose, constricted twig swellings, diameter 1.5 cm.

Coleop. Bronze birch borer. Agrilus politus Say

Sterile catkins deformed, swollen basally. Pl. 7, fig. 3. Stebb. '10, p. 16

Itonid. Hazel catkin gall. Cecidomyia squamulicola Stebb.

Slightly swollen, aborted buds, length 4 mm, diameter 3mm. Fig. 48

Itonid. Hazel bud gall. Cecidomyia sp. a1737

Bud deformation checking further development as soon as it has begun to expand. Pl. 15, fig. 5. Chad. '08, p. 131

Acarid. Eriophyes sp.

Red-haired, leaf fold. Felt '15e, p. 193

Itonid. Red plush gall. Lasiopteryx coryli Felt

Reared from same gall. Felt '07a, p. 128

Itonid. Mycodiplosis corylifolia Felt

Ostrya (hop hornbeam)

Terminal folded leaves

Itonid. Cecidomyia sp.

Globose, red-tinted pocket gall, diameter 1–2 mm. Wells '14, p. 293

Acarid. Eriophyes sp.

Carpinus (hornbeam, ironwood)

Reddish leaf fold along lateral veins. Osten Sacken '62, p. 202

Itonid. Hornbeam leaf fold, Cecidomyia pudibunda O. S.

Betula (birch)

Under decaying bark. Felt. '13m, p. 205

Itonid. Miastor americana Felt

From bark of black birch injured by a Sesian

Itonid. Mycodiplosis corylifolia Felt

Under decaying bark. Felt '12f, p. 246

Itonid. Itonida putrida Felt

Under decaying bark, presumably predaceous

Itonid. Lestodiplosis sp.

Crowded, irregular bud deformation, often in large bunches, on B. lutea. Incipient "witches broom"? Pl. 15, fig. 2. Chad. '08, p. 128

Acarid. Eriophyes sp.

Irregular twig and branch annulations. Felt '06, p. 287

Coleop. Bronze birch borer, Agrilus anxius Lec.

Reared from seeds. Lintn. '96, p. 162

Itonid. Birch seed midge, Oligotrophus betulae Winn.

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[1] Generic reference is provisional.

Leaves or parts of leaves thickly corrugated by approximate, lobulate, intervenal swellings. Fig. 49. Felt '06, p. 645
Hemip. Spiny witch hazel gall. Hamamelistes spinosus Shim.

Pocket galls, chiefly on the upper side of the leaf, often confluent. Chad. '08, p. 129
Acarid. Eriophyes sp.

Nodular pocket gall occurring on both leaf surfaces, yellowish or reddish to purplish, on B. papyrifera. Chad. '08, p. 129
Acarid. Eriophyes sp.

A crimson red erineum turning to ochreous in straight, beady lines midway between the ribs or closely bordering them, on B. lenta. Chad. '08, p. 128
Acarid. Eriophyes sp.

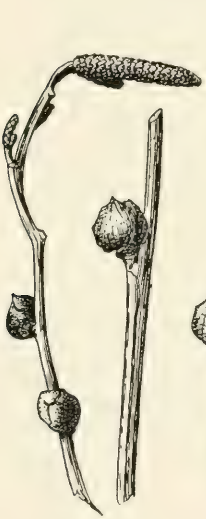

Fig. 50. Alder bud gall, Dasyneura serrulatae O. S. (Original)

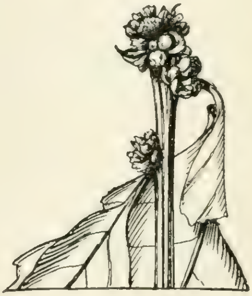

Fig. 51. Chestnut bud gall, Rhopalomyia castaneae Felt. (Original)

A rosy pink erineum in large patches on upper leaf surface, on B. lenta. Chad. '08, p. 128
Acarid. Eriophyes sp.

Small, irregular, mostly elongate, red, crummy leaf patches on B. alba, B. nigra. Chad. '08, p. 128
Acarid. Eriophyes sp.

Yellowish white to brownish erineum, forming large patches on the under surface of the leaf, on B. papyrifera. Chad. '08, p. 129
Acarid. Eriophyes sp.

A bright rusty erineum lining dimples on the under side of the leaf, dark brown or brick red when dry, on B. populifolia. Chad. '08, p. 129
Acarid. Eriophyes sp.

A transparently white, granular erineum on the leaf surface of B. pumila. Chad. '08, p. 129

Acarid. Eriophyes sp.

An erineum with simple trichomes on leaf of Betula sp. Chad. '08, p. 129

Acarid. Eriophyes sp.

Alnus (alder)

Irregularly oval stem swelling, length 5 cm, diameter 1 cm. Felt and Joutel '04, p. 18

Coleop. Alder stem borer, Saperda obliqua Say

Subconical bud gall, diameter 6 to 12 mm. Fig. 50. Felt '15e, p. 186

Itonid. Alder bud gall, Dasyneura serrulatae O. S.

Small, red, pubescent, pocket gall on leaf of A. incana. Pl. 15, fig. 1. Chad. '08, p. 126

Acarid. Eriophyes sp.

Small, remote, pocket gall on upper leaf surface of A. rugosa. Chad. '08, p. 126

Acarid. Eriophyes sp.

Erineum with simple trichomes on leaves of A. alnobetula. Chad. '08, p. 125

Acarid. Eriophyes sp.

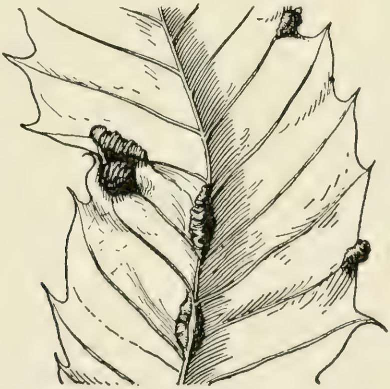

Fig. 52. Cecidomyia sp. Vein gall on chestnut. (Original)

An erineum on leaves of A. ? glutinosa. Chad. '08, p. 125

Acarid. Eriophyes sp.

A white, frostlike erineum on the under side of the leaf in the vein axils, on A. incana. Chad. '08, p. 125

Acarid. Eriophyes sp.

Small, reddish or whitish, flat, woollen patches on the upper leaf surface of A. incana. Chad. '08, p. 126

Acarid. Eriophyes sp.

Fagaceae (beech family)

Fagus (beech)

Sparse, somewhat dimpled, rosy or vinose erineum on under leaf surface, on F. americana. Chad. '08, p. 152

Acarid. Eriophyes sp.

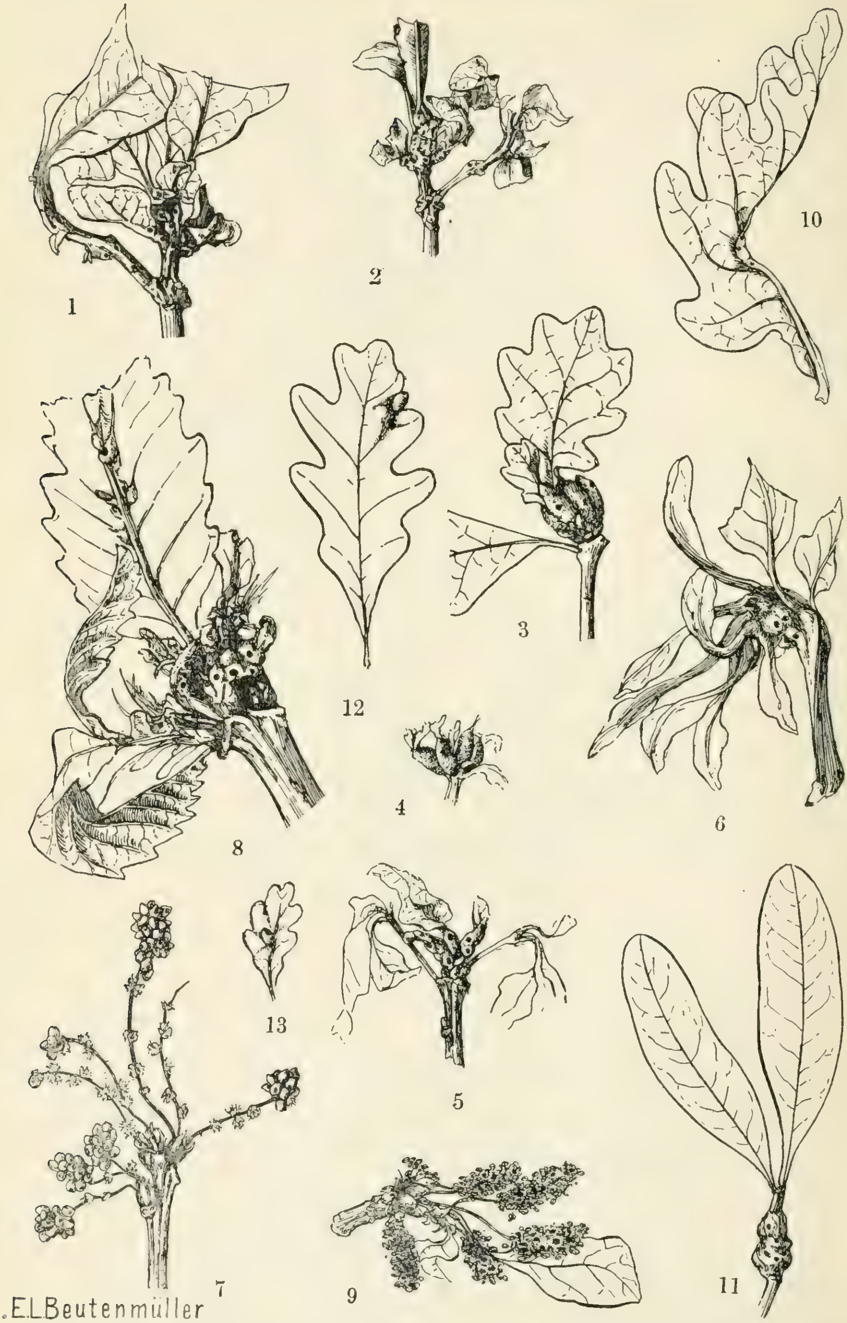

Fig. 53. Neuroterus galls. 1–2. Gall of N. tectus Bass. 3–5. Gall of N. minutus Bass. 6. Gall of N. distortus Bass. 7. Oak flower stem gall, N. pallidus Bass. 8, 9. Gall of N. vernus Gill. 10. Gall of N. pallipes Bass. 11. Gall of N. longipennis Bass. 12, 13. Gall of N. clarkeae Beutm. (After Beutm., Am. Mus. Nat. Hist.)

Golden, rusty or dark brown erineum on the under leaf surface of F. americana. Chad. '08, p. 132
Acarid. Eriophyes sp.

A whitish or golden yellow to brown erineum on the upper leaf surface between or following the veins. Pl. 15, fig. 7. Chad. '08, p. 133
Acarid. Eriophyes sp.

A frosty white erineum in large patches on the under leaf surface of F. sylvatica. Chad. '08, p. 133
Acarid. Eriophyes sp.

Castanea (chestnut)

Under decaying bark. Felt '13m, p. 205
Itonid. Miastor americana Felt

Under decaying bark. Felt '15i, p. 140
Itonid. Winnertzia pectinata Felt

Under decaying bark. Felt '11k, p. 557
Itonid. Itonida pugionis Felt

Under decaying bark. Felt '15i, p. 220
Itonid. Janetiella ligni Felt

Petiole or terminal bud gall. Fig. 51. Felt '09e, p. 229
Itonid. Chestnut bud gall, Rhopalomyia castaneae Felt

Fusiform, ribbed, greenish or brown mid or lateral vein swelling, length 7 to 15 mm, diameter 3 to 5 mm. Fig. 52.
Itonid. Cecidomyia sp.

Globose or hemispherical capsule leaf gall, diameter 2 to 3 mm. Chadwick, '08, p. 130
Acarid. Eriophyes sp.

Galls encircling young twigs and resembling in size and shape egg masses of the forest tent caterpillar. Braun '17, p. 198
Lepid. Ectoedemia castaneae Busck.

Irregular swelling of the burr of C. pumila
Itonid. Cecidomyia chinquapin Beutm.

Irregular swelling of the base of the petiole, dimensions approximately 7 by 10 mm, on C. pumila
Itonid. Cecidomyia sp.

Castanopsis sp. (Western Chinquapin)

Globular, brown, thin-shelled blossom galls, internally soft, pithy, diameter 12 to 24 mm. Beutm. '17, p. 345
Cynipid. Andricus castanopsidis Beutm.

Quercus (oak)

Key to oak galls

1 Root galls, p. 54
2 Gall insects reared from decaying bark or wood, p. 54
3 Galls of branches and twigs, the deformations not separable from the plant (compare with 4, p. 62), p. 54
4 Galls attached to branches and twigs but more or less separated from the normal plant tissues [compare with 3, p. 54 and also with oak apples (10), p. 95], p. 62
5 Gall consisting of one or more larval cells or capsules in a leaf bud, p. 74
6 Galls of the leaves (in some cases a leaf itself is aborted and the gall issues from the twig or bud), p. 78
7 Galls of the aments or catkins, p. 116
8 Galls of the fruits, p. 117

1 *Root galls*

Globose, polythalamous root galls on Q. laurifolia. Beutm. '09, p. 277
Cynipid. Eumayria floridana Ashm.

Irregular, brownish black, globose, dense, pithy root gall, diameter 1.2 cm, on Q. wislizeni Ashm. '97, p. 120
Cynipid. Callirhytis apicalis Ashm.

Irregular, globose, fleshy, polythalamous root swelling, diameter 4 cm or less, on live oak. Ashm. '97, p. 132
Cynipid. Callirhytis rhizoxenus Ashm.

Irregular, polythalamous root gall, diameter 3.5 cm, on Q. minor
Cynipid. Odontocynips nebulosa Kieff.

Polythalamous, fig-shaped, yellowish galls just below the surface of the ground, on Q. alba and Q. minor. Fig. 87, 9, 10. Beutm. '11, p. 354
Cynipid. Oak fig root gall, Dryophanta radicola Ashm.

Irregular, polythalamous, brown, woody root gall on Q. virginiana. Fig. 65, 1. Beutm. '09, p. 278
Cynipid. Belenocnema treatae Mayr.

Irregularly rounded, rugose, fleshy root gall. Ashm. '97, p. 113
Cynipid. Trigonaspis radicis Ashm.

Blisterlike swellings in the smooth bark of the roots, sometimes covering them for a distance of 2 feet or more from the tree, on Q. alba. Bassett '89, p. 237
Cynipid. Callirhytis radicis Bass.

Globose, polythalamous grayish root gall with dimensions up to 3 x 4½ inches. Ent. News, 10:193
Cynipid. Andricus championi Ashm

2 *Gall insects reared from decaying bark or wood*

Reared from larvae under decaying bark. Felt '13m, p. 205
Itonid. Miastor americana Felt

Reared from larvae under decaying bark. Felt '13m, p. 215
Itonid. Leptosyna quercivora Felt

Reared from larvae under decaying bark. Felt '11k, p. 558
Itonid. Itonida cincta Felt

Reared from larvae under decaying bark. Felt '15h, p. 407
Itonid. Parallelodiplosis corticis Felt

3 *Galls of branches and twigs, the deformations not separable from the plant* (Compare with 4, p. 62)

a No visible gall or only a slight swelling. *See also* b–d, e, f, g–h on pages 56, 58, 60 and 61 respectively

Cocoonlike gall, diameter 2.5 mm, hidden in a branch under the bark and with no visible external swelling, on Q. catesbaei. Ashm. '87, p. 145
Cynipid. Andricus cryptus Ashm.

Slight and very inconspicuous enlargements at the base of new shoots, on Q. velutina. Bassett '00, p. 324
Cynipid. Callirhytis ceropteroides Bass.

Slightly swollen twigs of last summer's growth, on Quercus species. Beutm. '10, p. 126
Cynipid. Neuroterus virgens Gill.

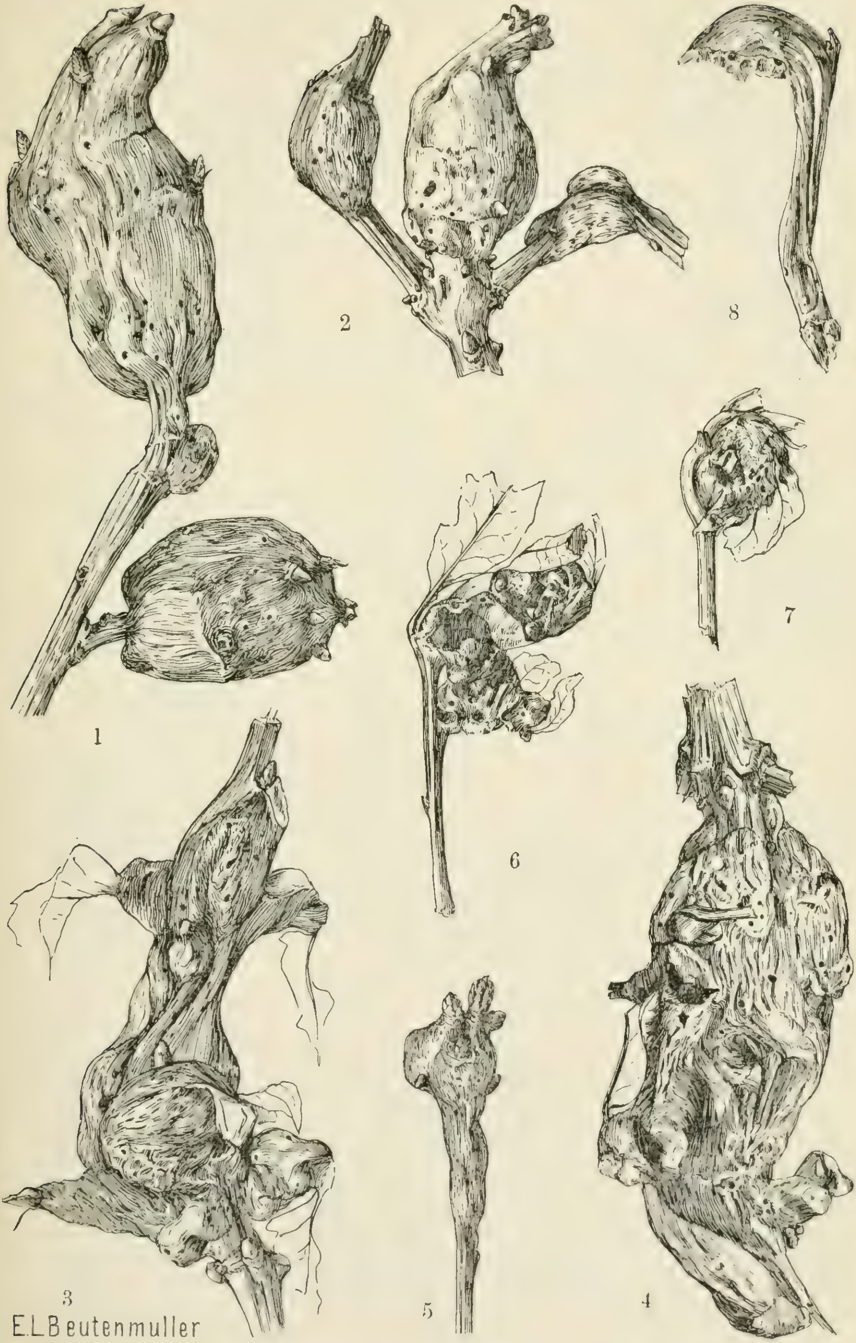

Fig. 54. Oak potato gall, Neuroterus batatus Fitch, 1–6 showing various types of galls. (After Beutm., Am. Mus. Nat. Hist.)

Slight, hardly visible, wavy swellings at the base of tender new shoots, on Q. catesbaei. Ashm. '81, p. XV

Cynipid. Neuroterus catesbaei Ashm.

Elongate twig swelling, length 20 mm, diameter 10 mm, on Q. douglasi. Fullaway '11, p. 345

Cynipid. Cynips kelloggi Full.

Bud-shaped, elongate, pointed apically, thin-walled and hollow. Length 3 to 4 mm, on trunk of white oak. Beutm. '17, p. 347

Cynipid. Andricus gemmiformis Beutm.

Reared from slightly swollen, white oak twigs of Q. alba. Fig. 56. Felt '08e, p. 324

Itonid. Oak twig midge, Lasioptera querciperda Felt

Elongate twig gall, the walls thin, consisting of thickenings of the woody tissues and not visible externally or forming only slight swellings, on Q. pedunculata. Kieff. '10, p. 4

Cynipid. Loxaulus ashmeadi Kieff.

b Twig dwarfed but not specially modified

Irregular, polythalamous swellings in the bud or very young leaves, producing rosettelike clusters of small leaves on Q. platanoides. Fig. 53, 6. Beutm. '10, p. 127

Cynipid. Neuroterus distortus Bass.

Irregular enlargements of the small twigs, on Q. prinoides. Fig. 53, 1, 2. Beutm, '10, p. 126

Cynipid. Neuroterus tectus Bass.

Inconspicuous enlargements of the upper portion of very young, tender shoots, on Q. obtusiloba. Beutm. '11, p. 359

Cynipid. Dryophanta longicornis Bass.

c Twig dwarfed, distorted and forms a short, ovoid mass, polythalamous

Woody, apical swellings 18 to 36 mm long, 12 mm in diameter, on Q. tinctoria and Q. rubra. Pl. 2, fig. 8. Bassett '64, p. 683

Cynipid. Andricus scitulus Bass.

Woody, polythalamous twig gall, length 15 mm, diameter 6 mm, resembles the gall of A. scitulus Bass. and that of A. tectus Bass., on Q. ilicifolia, Q. imbricaria. Bassett '00, p. 311

Cynipid. Andricus tuberosus Bass.

d Twig swollen, dwarfed or distorted into a more or less club-shaped, polythalamous gall

Irregular, potato-shaped, polythalamous, woody leaf or twig gall, green in summer and brown in winter, diameter 1.8 cm, on Q. alba. Fig. 54. Beutm. '10, p. 118

Cynipid. Oak potato gall, Neuroterus batatus Fitch

Irregularly rounded, woody, aborted leaves and buds on young terminal twigs, diameter 4 to 12 mm, on Q. alba. Fig. 81, 3. Beutm. '10, p. 119

Cynipid. Neuroterus consimilis Bass.

Irregular, length 5 to 100 mm, diameter 4 to 25 mm, similar to N. batatu but on the twigs (winter form) or the midrib and petiole of the leaves (spring

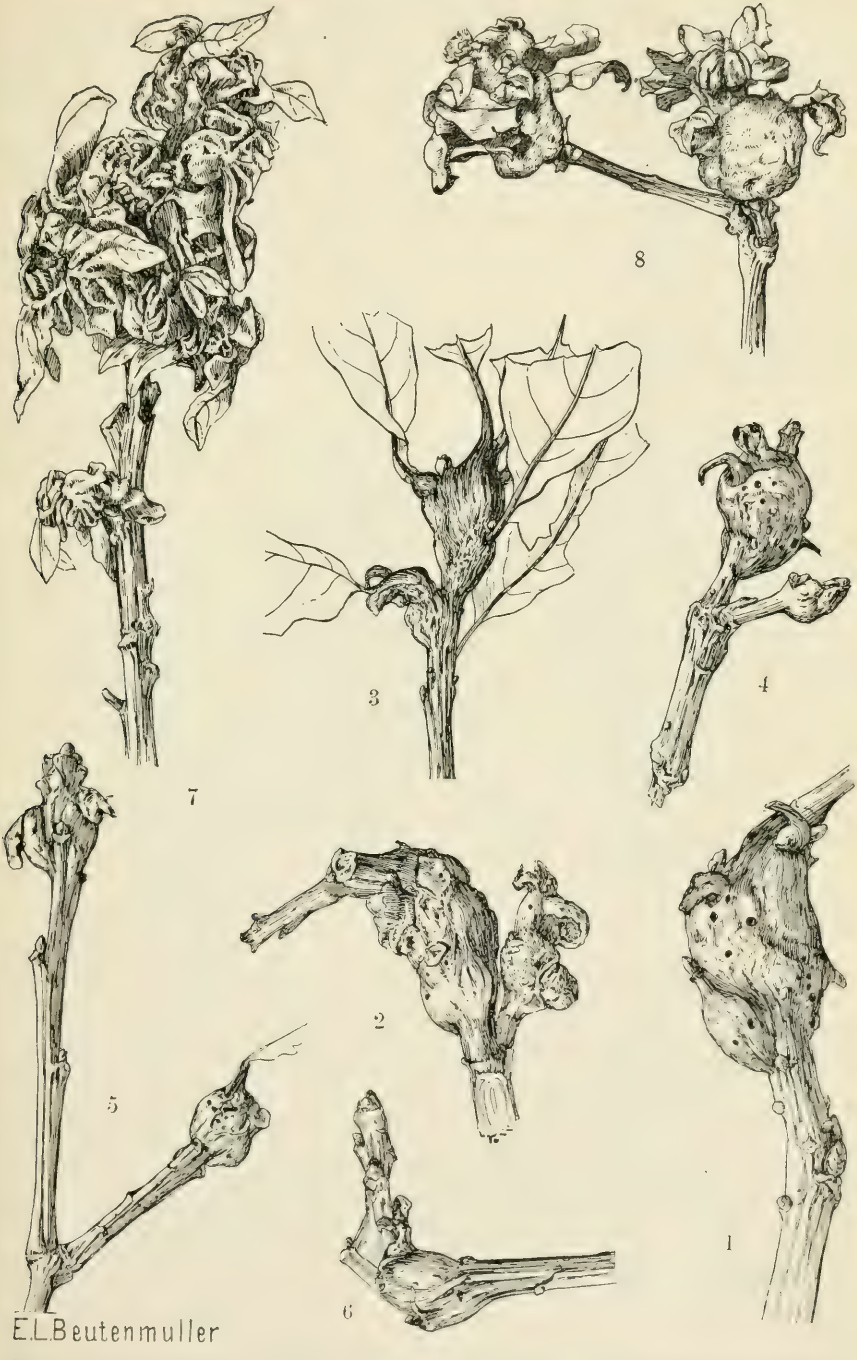

Fig. 55. Noxious oak gall, *Neuroterus noxiosus* Bass. 1-8 showing various types of galls. (After Beutm., Am. Mus. Nat. Hist.)

form), the blade of the leaf dwarfed, curled and shriveled, on Q. platanoides. Fig. 55. Beutm. '10, p. 118

Cynipid. Noxious oak gall, Neuroterus noxiosus Bass.

Globose, hard, corky twig gall, diameter 18 to 20 mm on Q. alba. Osten Sacken '62, p. 255

Cynipid. Cynips juglans O. S.

Irregular, polythalamous, woody twig gall, length 10 cm, diameter 2.5 cm, twigs not more than 4 to 6 mm in diameter. Cal. Trotter '11, p. 113

Cynipid. Andricus sp.

Subglobose, lateral, grayish red or fulvous twig gall, the surface smooth, shining and irregularly warty, diameter 8 to 10 mm. Mex. Trotter '11, p. 126

Cynipid. ? Cynips sp.

Subglobose, polythalamous, solitary or clustered (if the latter more or less fused basally) twig gall, diameter 10 to 15 mm. Mex. Trotter '11, p. 128

Cynipid. ? Cynips sp.

e A swelling surrounding the twig, especially at the base of the lateral shoots, often large, abrupt and woody; potato galls

(1) Not woody or a little woody fiber surrounding the larval cells

Hemispherical, woody, polythalamous knots at the base of young shoots, diameter 12 to 18 mm, larval cells thin-walled, on Q. alba. Bassett '81, p. 76

Cynipid. Loxaulus mammula Bass.

Globose, hard knots, the surface rough, blackened, deeply and irregularly fissured, diameter nearly 2.5 cm, apical on the twig, on Q. ? virens. Bassett '90, p. 75

Cynipid. Callirhytis ruginosus Bass.

Hard, woody knots sometimes terminal on shoots of oak sprouts, more often enlargements at the base of small, lateral branches; terminal galls, diameter 2.5 cm, strawberry-shaped, on Q. castanea. Bass '90, p. 76

Cynipid. Callirhytis seminosus Bass.

Subglobose or reniform, irregular, rather thin-walled, monothalamous, smooth, reddish twig gall, length 4 to 7 mm, diameter 3 to 5 mm. Mex. Trotter '11, p. 126

Cynipid. ? Cynips sp.

(2) Woody fiber abundant, without hornlike projections

Irregular, potato-shaped, polythalamous woody galls, diameter 1.8 cm, on Q. alba. Fig. 54. Beutm. '10, p. 118

Cynipid. Oak potato gall, Neuroterus batatus Fitch

Irregular, globose, frequently confluent twig galls, length 10 cm, diameter 3 cm, on Q. nigra, Q. coccinea, Q. rubra and Q. ilicifolia. Fig. 57. Bassett '63, p. 323

Cynipid. Gouty oak gall, Andricus punctatus Bass.

Abrupt, irregular, potatolike twig or branch swellings, length 10 to 20 mm, diameter 8 mm, on Q. virginiana. Ashm. '81, p. XI

Cynipid. Live oak potato gall, Andricus batatoides Ashm.

Hard, smooth, knotlike twig swellings, diameter 20 mm, on Quercus species. Bassett '81, p. 112; '00, p. 320

Cynipid. Andricus coxii Bass.

Irregularly rounded or elongate, woody, polythalamous twig swellings much like those of A. coxii, on Q. virginiana. Beutm. '09, p. 281

Cynipid. Compsodryoxenus maculipennis Ashm.

Irregular, dense, corky, polythalamous twig swellings, length 4 cm, diameter 1.6 mm, on Q. undulata. Gill. '92, p. 247

Cynipid. Andricus frequens Gill.

A gradual twig or branch swelling 3.6 to 8 cm long and 12 to 24 mm in diameter, on Q. cinerea. Ashm. '85, p. VIII

Cynipid. Andricus medullae Ashm.

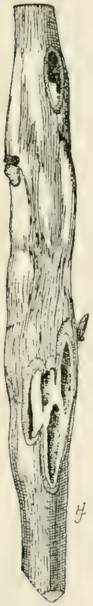

Fig. 56. Oak twig midge, Lasioptera querciperda Felt. (Original)

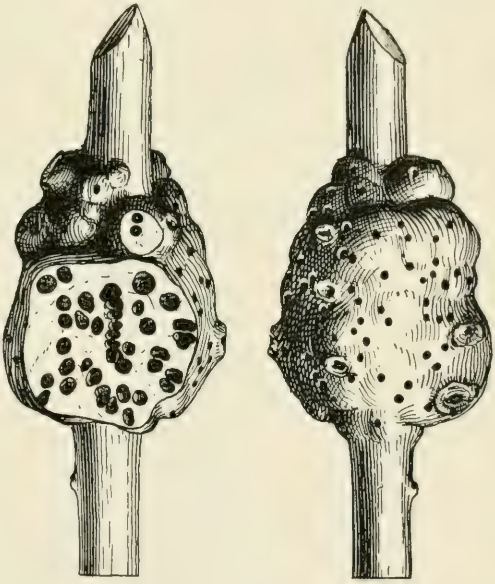

Fig. 57. Gouty oak gall, Andricus punctatus Bass. Old gall and one in section. (Original)

Irregular twig enlargement similar to that of A. medullae, length 1.2 to 3 cm, on Q. chrysolepis. Ashm. '97, p. 124

Cynipid. Callirhytis chrysolepidicola Ashm.

Oblong, irregular, woody swellings on leaf petioles or at the base of the new shoots, length 8 to 9 mm, diameter 3.5 to 4 mm, on Q. laurifolia. Fig. 53, 11. Beutm. '10, p. 125

Cynipid. Neuroterus longipennis Ashm.

Irregularly rounded or elongate, somewhat potato-shaped, polythalamous oak twig gall, length 15 to 30 mm, diameter 14 to 20 mm, on unknown scrub oak. Beutm. '07, p. 464

Cynipid. Andricus wheeleri Beutm.

(3) Larval cells each surrounded by a tube of cellular tissue differentiated from the general substance of the galls; tubes may project from the surface in the matured gall

(*a*) Tubes never project.

Globose or elongate twig and branch gall, length 1.2 to 5 cm, the wood hard, curled, the bark smooth and within concealed, rounded, subcompressed tubes, on Q. agrifolia, Q. chrysolepis. Bass. '81, p. 54
Cynipid. Callirhytis suttoni Bass.

(*b*) Tubes project like horns or spines

Globose twig gall, irregular, woody, variable in size, with many hornlike projections, occurs on Q. palustris, Q. ilicifolia, Q. digitata and Q. nigra. Pl. 1, fig. 9. Osten Sacken '62, p. 251
Cynipid. Horned oak gall, Andricus cornigerus O. S.

Clustered, fifty to one hundred, quadrate or hexagonal tubes somewhat resembling a honeycomb and arising from trunks of young red and scarlet oak, Q. rubra and Q. coccinea Beutm. '11c, p. 197
Cynipid. Honey-comb twig gall, Dryocosmus favus Beutm.

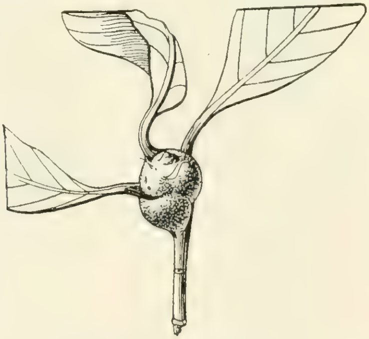

Fig. 58. White cak club gall. Andricus clavulus O. S. (Original)

Abrupt, irregular, woody, tuberlike twig gall, at first smooth, later rough, with deep fissures and spiny, succulent tubes, diameter 12 to 30 mm, on Q. virginiana. Ashm. '81, p. XXVI
Cynipid. Andricus clavigerus Ashm.

f Polythalamous, woody swellings at base of twig, eccentric on twig (grade to last group)

A hard, knotty swelling at the base of small twigs and branches, length 9 to 18 mm, diameter 8 to 10 mm, on Q. aquatica. Ashm. '87, p. 144
Cynipid. Callirhytis aquaticae Ashm.

Globular, irregular, somewhat elongate, single or clustered, polythalamous oak twig galls; individual galls, diameter 4 to 15 mm, the nutlike masses with a diameter of 40 mm, on Q. nana. Beutm. '07, p. 463
Cynipid. Andricus davisi Beutm.

Subreniform, irregular, polythalamous, unilateral twig gall, smooth, shining, yellowish or yellowish brown, length 3 cm, diameter 2 cm. Cal. Trotter '11, p. 111
Cynipid. ? Disholcaspis sp.

g Pustular elevations of the bark, often enlarging the twig

Abrupt, irregular twig swellings varying from round, pustule-like bodies 4 mm in diameter to confluent, polythalamous masses 25 mm long and 12 mm in diameter, on Q. prinus. Fig. 107, 11. Beutm. '10c, p. 120
Cynipid. Neuroterus rileyi Bass.

h Monothalamous terminal enlargements or club galls on twigs

Globe-shaped, apical, woody twig galls, length 12 to 25 mm, on Q. alba. Fig. 58, pl. 2, fig. 2. Osten Sacken '65, p. 351
Cynipid. White oak club gall, Andricus clavulus O. S.

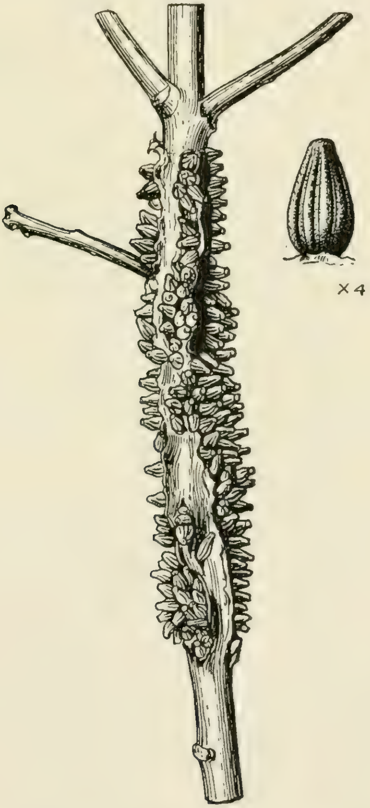

Fig. 59. Andricus gemmarius Ashm. Badly infested twig and one gall enlarged. (Original)

Ovate or globose apical twig gall, leafy, diameter 7 to 8 mm, on willow oak. O. S. '61, p. 70
Cynipid. Andricus[1] phellos O. S.

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[1] Generic reference by Beutenmuller.

Irregular, monothalamous, green twig galls, length 18 mm, diameter 12 mm, when green covered with leaves, on Quercus species. Bassett '90, p. 82
Cynipid. Andricus howertoni Bass.

Club-shaped, woody, apical galls on small limbs, the apex blunt and generally turned to one side. Pl. 2, fig. 9. Bassett '64, p. 685
Cynipid. Scrub oak club gall, Callirhytis similis Bass.

4 *Galls attached to branches and twigs and more or less separated from the normal plant tissues* (Compare with 3, p. 54 and also oak apples (10), p. 95. *See also*, *b* and *c* on p. 71 and *d* on p. 72.

a Bullet galls, that is woody galls attached to the twigs and in small clusters or solitary

(1) Polythalamous

Subglobular, polythalamous, sessile twig gall, diameter 2 to 6 cm, on Q. lobata. Fullaway '11, p. 346
Cynipid. Andricus californicus Bass.

Globose, polythalamous, sessile twig galls resembling round apples, surface brown, smooth, 2.5 to 5 cm, on Q. agrifolia. Bassett '81, p. 74
Cynipid. Callirhytis pomiformis Bass.

Globose, irregular, yellowish brown to dark brown, mostly smooth and shining, probably twig gall, diameter 1 to 1.5 cm, on Quercus species. Bassett '90, p. 83
Cynipid. Andricus maxwelli Bass.

Globose, irregular, hard, pithy, brown gall, externally finely granulated and with a few short, blunt spines, interior hard, pithy, brown, polythalamous, diameter 8–10 mm. Ashm. '97, p. 117
Cynipid. Andricus murtfeldtae Ashm

Irregular, rugose, yellowish brown, woody, polythalamous, apical twig gall, apparently with a long peduncle or this may be the apex of a leaf petiole, length 2 to 4 cm, diameter 1 to 2 cm, on Q. agrifolia, Q. chrysolepis Ashm. '97, p. 120
. Cynipid. Andricus congregatus Ashm.

Clustered, variable, presumably green, soft, succulent galls occurring in leaf axils and about as large as a chestnut or hazelnut. Beutm. '11, p. 354
Cynipid. Dryophanta pumiliventris Bass.

Globose, clustered, polythalamous, buff-colored twig galls, diameter 3 to 5.5 cm, on Q. garryana. Gill. '94, p. 235
Cynipid. Andricus spongiola Gill.

Irregularly rounded, polythalamous, as it ages becoming brown, rugose, fissured, length 55 mm, diameter 3.5 mm, on live oak. Beutm. '13, p. 243
Cynipid. Andricus montezumus Beutm.

(2) Small, monothalamous, without distinct central cell

(*a*) Situated in fissures in the twigs

Irregular, brown, somewhat smooth twig gall arising from a slit and with transverse depressions, indicating coalescence, length 25 mm, diameter 12 mm, on Q. chrysolepis var. vaccinifolia. Fig. 64, 13. Beutm. '09, p. 38
Cynipid. Disholcaspis truckeensis Ashm.

Globose, densely rugose, grayish, slightly flattened twig galls, the rugosites in five or six transverse rows, diameter 2 to 2.5 mm, transverse 3 to 4 mm, the galls

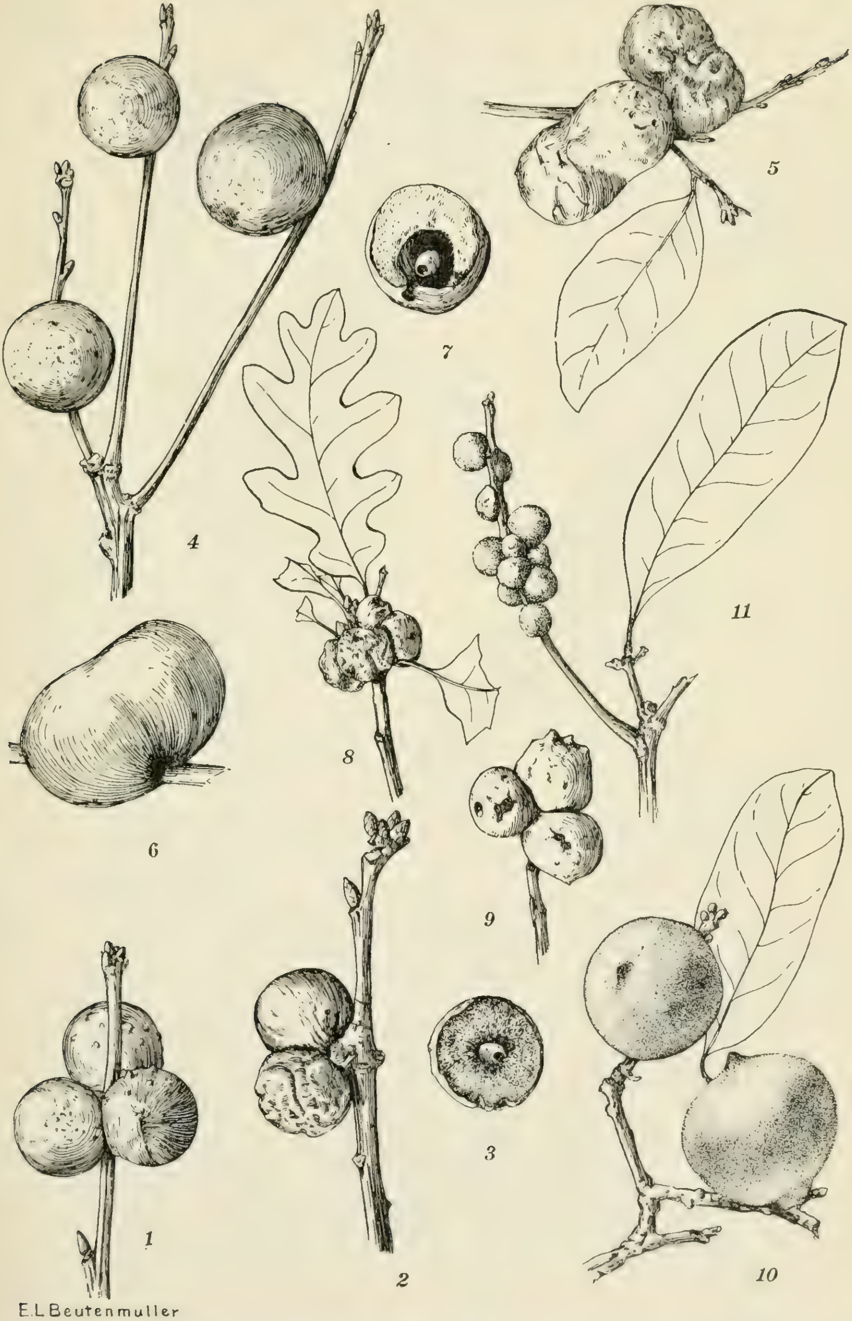

Fig. 60. Oak bullet galls. 1–3. Oak bullet gall, Disholcaspis globulus Fitch. 4–7. D. omnivora Ashm. 8, 9. D. rubens Gill. 10. Mealy oak gall, D. cinerosa Bass. 11. D. succinipes Ashm. (After Beutm., Am. Mus. Nat. Hist.)

clustered in fissures or slits on the terminal twigs, on Q. cinerea. Ashm. '87, p. 143

Cynipid. Andricus difficilis Ashm.

Generally oval, sometimes irregularly shaped, usually smooth, cells filling longitudinal slits or fissures in twigs of Q. rubra. Ashm. '97, p. 121

Cynipid. Andricus excavatus Ashm.

Globose, hard, brown twig galls with a diameter of 7 to 10 mm, occurring several together in fissures in the twigs, on Q. imbricaria and Q. ilicifolia. Ashm. '97, p. 122

Cynipid. Andricus imbricariae Ashm.

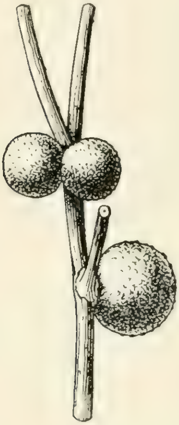

Fig. 61. Oak bullet gall, Disholcaspis globulus Fitch. (Original)

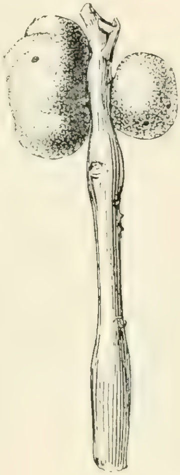

Fig. 62. Disholcaspis omnivora Ashm. (Original)

(*b*) Not inserted in fissures on the twigs

Numerous small, oblong, rugose, budlike galls surrounding the twig, sometimes issuing from the sides of the larger branches, length 2.5 to 3 mm, on Q. cinerea. Fig. 59. Ashm. '85, p. IX

Cynipid. Andricus gemmarius Ashm.

Oblong, oval, longitudinally ribbed, brown galls without a distinct cell, dehiscent, arising in clusters of two to three in bud axils, on Q. cinerea. Ashm. '87, p. 142

Cynipid. Jumping ribbed gall. Andricus saltatus Ashm.

Ellipsoidal, smooth, monothalamous, snuff-colored twig galls, length 5 to 7 mm, on Q. garryana. Gill. '94, p. 235

Cynipid. Callirhytis washingtonensis Gill.

Small, round, monothalamous twig galls, smooth, when dry wrinkled and resembling pepper corns, diameter 5 mm, on Q. alba. Bassett '90, p. 81

Cynipid. Andricus indistinctus Bass.

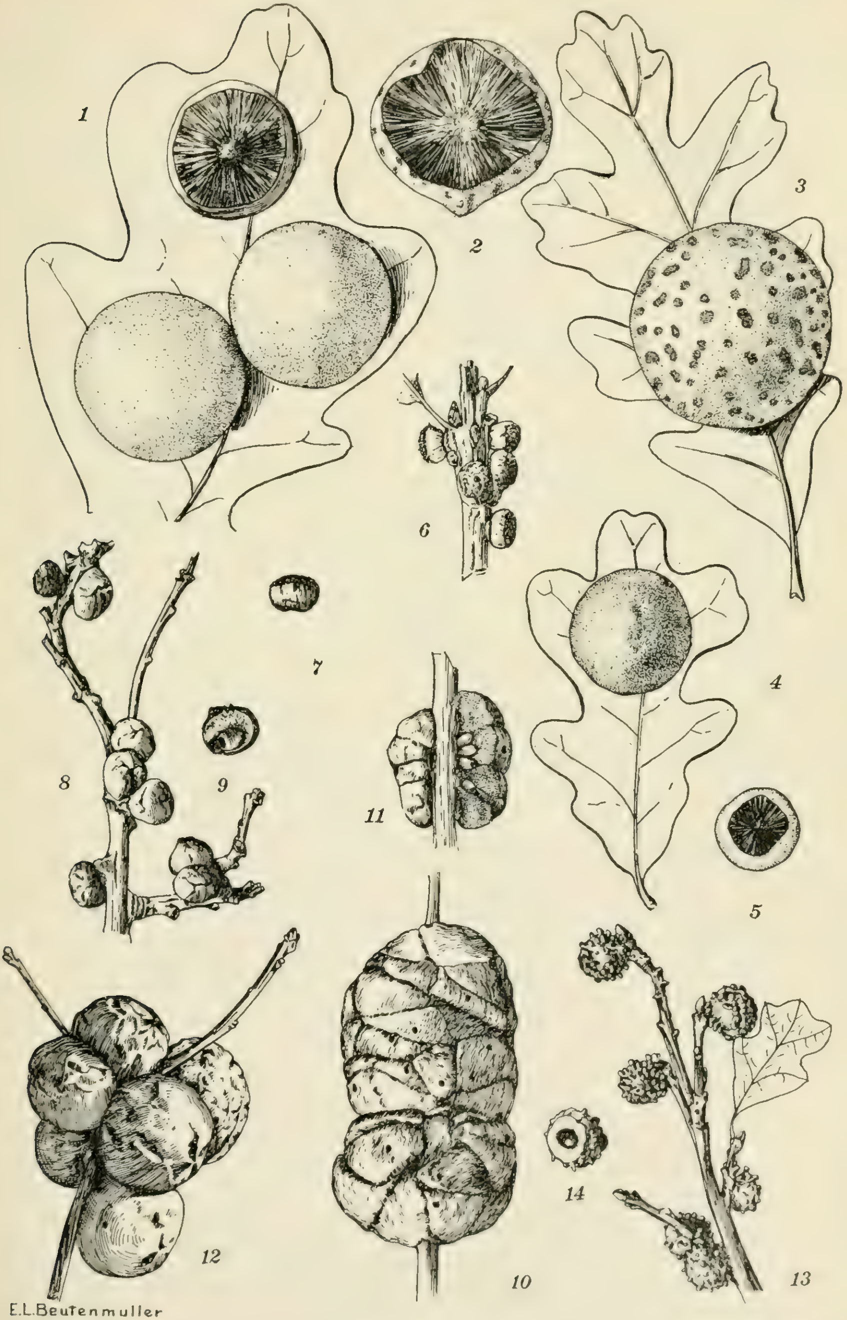

Fig. 63. Oak bullet galls. 1. Dryophanta centricola O. S. 2, 3. Cynips maculipennis Gill. 4, 5. Disholcaspis brevipennata Gill. 6, 7. D. eldoradensis Beutm. 8, 9. D. perniciosa Bass. 10, 11. D. spongiosa Karsch. 12. Oak bullet gall, D. globulus Fitch. 13, 14. Studded oak gall, Cynips corallina Bass. (After Beutm., Am. Mus. Nat. Hist.)

Subcylindrical, rounded apically, smooth, shining, translucent twig gall, height 8 mm, diameter 6 mm. Mex. Trotter '11, p. 128

Cynipid. ? Cynips sp.

(3) Typical bullet galls of a pithy or woody substance with a central cell in which the larva lives. This may be closely attached to the substance of the gall or fill a larger or smaller cavity within the gall.

(*a*) Globular or subglobular in shape

Globular, single or clustered, yellow, sometimes tinged with red, twig gall, diameter 8 to 16 mm, on various oaks. Fig. 60, 1–3, 61, 63, 12. Beutm. '09, p. 29

Cynipid. Oak bullet gall, Disholcaspis globulus Fitch

Globular, single or clustered, pale brown or yellowish, sometimes tinged with red, twig gall, diameter 8 to 20 mm, on various oaks. Beutm. '09, p. 31. Fig. 60, 4–7, 62

Cynipid. Disholcaspis omnivora Ashm.

Globose, milk-white or pale greenish, white-specked and marbled with green or lilac, oak twig gall, fleshy when fresh, becoming woody, dry and hollow, diameter 3 to 6 mm, on white oak and post oak. Beutm. '11b, p. 70

Cynipid. Marbled oak gall, Andricus pisiformis Beutm.

Globose, monothalamous, very hard, corky twig galls, diameter 9 to 15 mm, on Q. agrifolia. Bassett '81, p. 53

Cynipid. Callirhytis agrifoliae Bass.

Globose, with a pointed apex and the sides longitudinally grooved, a rose colored, monothalamous twig gall. The base imbedded in the twig resembles a very small seed onion, length 5 to 8 mm, diameter 4 to 5 mm, on black oak. Beutm. '11b, p. 69, '17, p. 348

Cynipid. Oak onion gall, Biorhiza caepulaeformis Beutm.

Globose, monothalamous, probably twig galls, the surface covered with a mealy, grayish powder, diameter 18 to 24 mm, on Quercus species. Bassett '81, p. 110

Cynipid. Andricus cinerosus Bass.

Globose, linear, clustered, mottled, light and dark green, monothalamous twig galls, diameter 6 to 12 mm, on Q. ilicifolia. Bassett '00, p. 328

Cynipid. Disholcaspis fasciata Bass.

Globose, smooth, corky, reddish brown twig or acorn gall, with a large central cell, diameter 8 to 12 mm, on Q. laurifolia. Fig. 111, 6, 7. Beutm. '09b, p. 63.

Cynipid. Amphibolips fuliginosa Ashm.

Globular, with a blunt point at the apex, hard and resembling small, dark-colored galls of D. globulus, the central cell not separating, length 10 mm, diameter 8 mm. Beutm. '09a, p. 35

Cynipid. Disholcaspis colorado Gill.

Globose, smooth or rough, light straw, usually red-tinted twig gall, diameter 10 to 14 mm, on Q. undulata. Fig. 60, 8, 9. Beutm. '09a, p. 32

Cynipid. Disholcaspis rubens Gill.

Globose, rugose, with raised lines and ridges, diameter 7 mm, on Q. marilandica. Fig. 64, 15, 16. Beutm. '09a, p. 33.

Cynipid. Disholcaspis persimilis Ashm.

Globose, rugose, monothalamous, dark brown twig galls, diameter 8 mm, of the cell 2 mm, occurring in clusters of 10 to 12, sometimes irregular, on Q. lobata. Fullwy. '11, p. 343

Cynipid. Cynips multipunctata Fullwy. (not Beutm.)

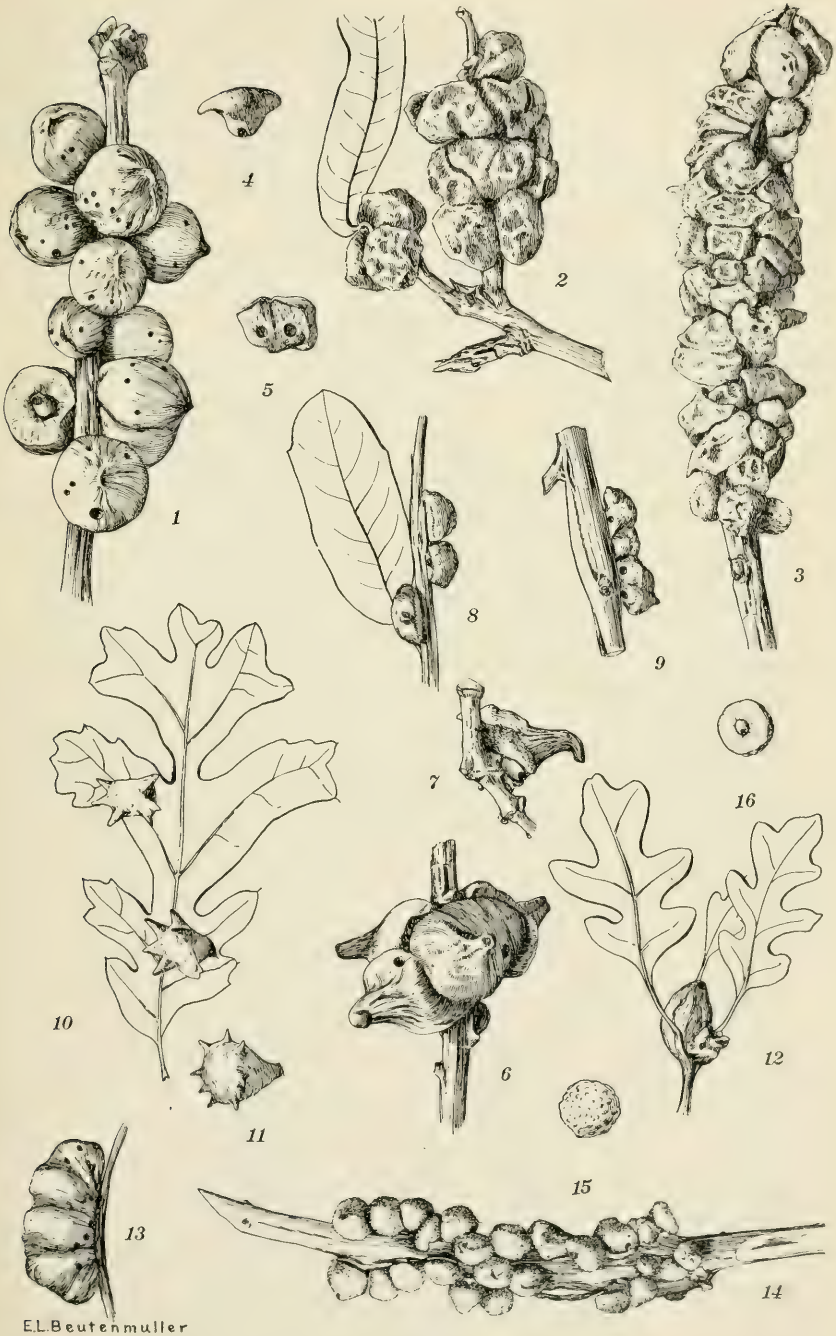

Fig. 64. Oak bullet galls. 1. Rough bullet gall, Disholcaspis mamma Walsh. 2–5. Woolly fig gall, D. ficigera Ashm. 6, 7. D. bassetti Gill. 8, 9. D. chrysolepidis Beutm. 10, 11. Spined turban gall, D. douglasii Ashm. 12. D. sileri Bass. 13. D. truckeensis Ashm. 14. D. succinipes Ashm. 15, 16. D. persimilis Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globular, thick-shelled, slightly nippled twig gall, green, becoming brown, diameter 14 to 17 mm, on Q. marilandica. Fig. 88, 3-5. Beutm. '09b, p. 60

Cynipid. Amphibolips globulus Beutm.

Globose, clustered, bluntly spurred twig gall resembling small specimens of D. mamma though the surface is more hoary, internally a larval cell attached but readily separated from the gall, diameter 10 mm, on dwarf oak, Q. douglasi. Fullaway '11, p. 342

Cynipid. Cynips canescens Bass.

Globose, reddish, buff-colored twig gall, irregularly and thickly studded with short, stout spurs, monothalamous, diameter 7 to 12 mm, on dwarf oak, Q. douglasi. Fig. 63, 13, 14. Beutm. '09a, p. 37

Cynipid. Studded oak gall, Cynips corallina Bass.

Globular, thin-shelled, yellowish, pink or red-tinged, clustered twig gall, within a larval cell supported by radiating fibers, diameter 20 to 40 mm, on Q. reticulata. Beutm. '11a, p. 86

Cynipid. Disholcaspis weldi Beutm.

Clustered, globose or bud-shaped, yellowish brown, later turning black, diameter 3 to 6 mm, on Q. virginiana. Fig. 60, 11, 64, 14. Beutm. '09a, p. 40

Cynipid. Disholcaspis succinipes Ashm.

Single or clustered, globose, nippled twig gall covered with a dense, mealy powder, within a partly free larval cell, diameter 12 to 22 mm, on Q. virginiana. Fig. 60, 10. Beutm. '09a, p. 36.

Cynipid. Mealy oak gall, Disholcapsis cinerosa Bass.

Globose, brownish yellow twig gall, the apex sometimes accuminate, diameter 6 to 16 mm, on Q. chrysolepis. Ashm. '97, p. 118

Cynipid. Andricus pacificus Ashm.

Irregular, somewhat rounded twig gall, the sides flattened, slightly oblique, ridged around the upper part of the sides, the apex rounded, occurs singly or in rows, usually closely pressed together, diameter 5 to 10 mm, height 4 to 7 mm, on Q. chrysolepis. Fig. 64, 8, 9. Beutm. '11b, p. 68

Cynipid. Disholcaspis chrysolepidis Beutm.

Globose, yellowish brown or dark brown, sometimes mottled with purple and brown, the interior hard and containing a small larval cell, diameter 3 to 4 mm, on Q. wislizeni. Ashm. '97, p. 119

Cynipid. Andricus wislizeni Ashm.

Ovate or globular, nippled, presumably twig gall containing a central larval cell and covered with a dense, fine, short pubescence, diameter 5 to 8 mm, on Q. chrysolepis. Ashm. '97, p. 119

Cynipid. Andricus chrysolepidis Ashm.

Globose, slightly nippled, wrinkled, with many short, spinelike projections, light yellowish brown, some of the spines tipped with pink, diameter 20 mm, on Q. chrysolepis. Beutm. '11c, p. 211

Cynipid. Andricus yosemite Beutm.

Globose, densely woolly, peach-like twig gall. Diameter 22 to 50 mm. Beutm. '17, p. 348

Cynipid. Amphibolips nigra Beutm.

Oblate, pale brown, broadly attached twig gall, diameter 4 to 7 mm, height 4 mm, on Q. kelloggii. Fig. 63, 6, 7. Beutm. '09a, p. 38

Cynipid. Disholcaspis eldoradensis Beutm.

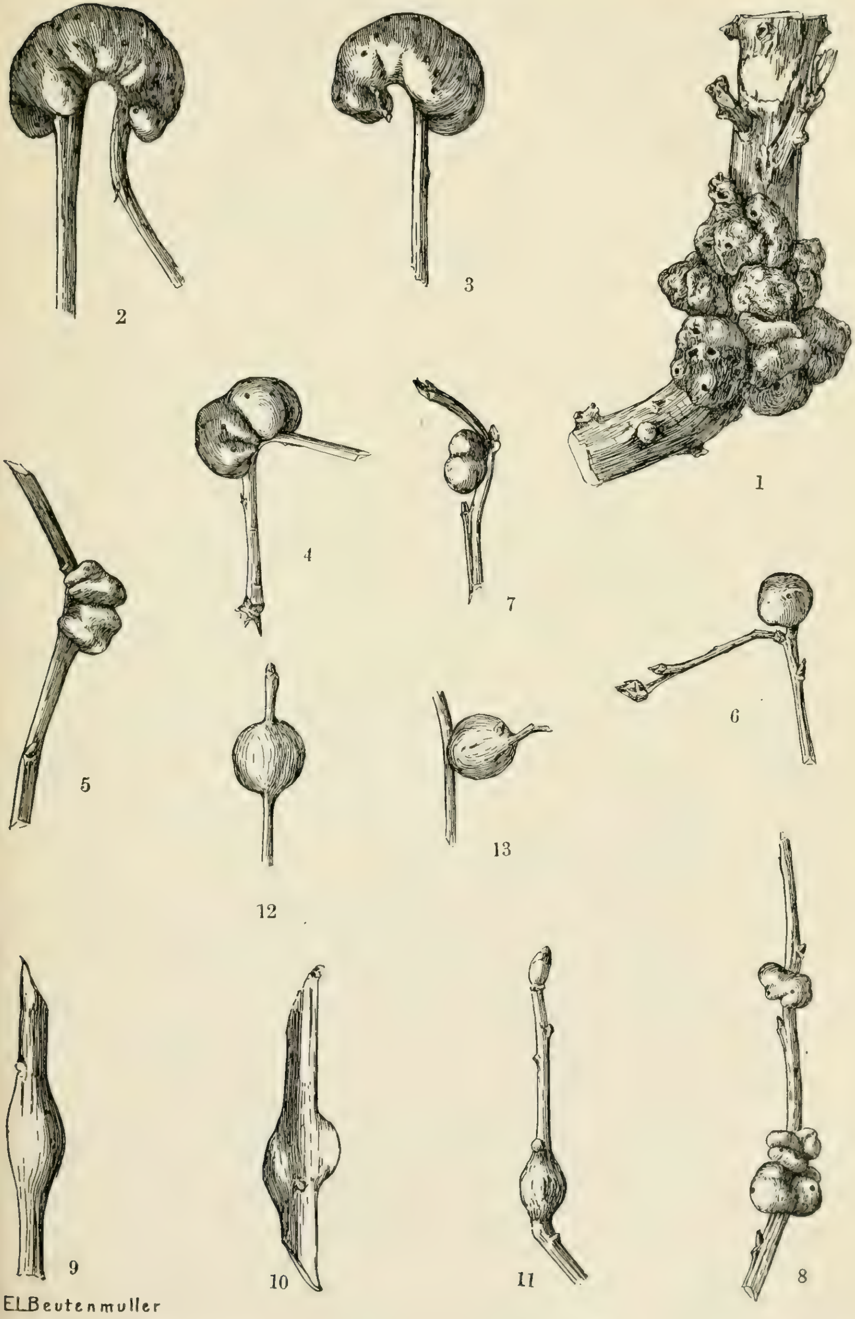

Fig. 65. 1. Oak fig root gall, Belenocnema treatae Mayr. 2–8. Blueberry stem gall, Solenozopheria vaccinii Ashm. 9–13. Compsodryoxenus brunneus Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globose, apical, somewhat pointed, crimson or scarlet, turning a dark brown, monothalamous, diameter 5 to 8 mm, on Q. undulata and Q. gambellii. Fig. 63, 8, 9. Beutm. '09a, p. 39

Cynipid. Disholcaspis perniciosa Bass.

Globose or irregular, clustered, woody, clay-brown or reddish tinged, twig galls, diameter of mass 30 mm, of individual galls 8 to 18 mm. Beutm. '11a, p. 87

Cynipid. Disholcaspis mexicana Beutm.

Globose, solitary, woody, thin-shelled twig gall, the tip frequently slightly pointed, the base somewhat excavated and partly surrounding the twig, pale orange, with short, gray hairs, internally a small basal cell, diameter of gall 12 to 15 mm. Ore. Trotter '11, p. 102

Cynipid. Andricus sp.

Globose, woody, solitary or clustered twig gall with a short stem, the dry galls of the same color as the twig, diameter 7.9 mm, of the cell 4 mm. Ore. Trotter '11, p. 102

Cynipid. Callirhytis sp.

(*b*) Form more ovoid, with a point at the apex

Globose, obscurely pointed, green, bright red, turning to brown or dark red, diameter 6 to 18 mm, on Q. platanoides, Q. macrocarpa. Fig. 64, 1. Beutm. '09a, p. 31

Cynipid. Rough bullet gall, Disholcaspis mamma Walsh

Ovate, green, becoming brown, bud gall usually with leaves growing from the sides and internally a closely imbedded though separate larval cell, length 9 mm, diameter 5 to 6 mm, on Q. undulata. Fig. 64, 12. Beutm. '09a, p. 34

Cynipid. Disholcaspis sileri Bass.

Globose gall covered with very fine, short, grayish pubescence and somewhat pointed at the apex; the larval cell occupies most of the gall, diameter 5 mm. Ashm. '97, p. 122

Cynipid. Andricus perplexus Ashm.

Irregularly pyriform twig gall with a bent point apically, diameter 1 cm, on Q. macrocarpa. Karsch '80, p. 291

Cynipid. Andricus macrocarpae Karsch

(*c*) Form more or less conical

Hard, conical, black or brownish black galls issuing from the bud axils on the larger branches, the apex sometimes curved, dimensions 12 by 6 mm, on Q. laurifolia, Q. phellos. Ashm. '81, p. XXVI

Cynipid. Andricus coniferus Ashm.

Irregular, somewhat triangular, hard, finely rugose, blackish, seedlike twig gall, mostly covered with a whitish bloom. Ashm. '97, p. 130

Cynipid. Callirhytis crassicornis Ashm.

Conical, clustered twig or branch gall, often deep red, becoming when dry, brown or black, length 12 to 18 mm, on Q. ilicifolia. Pl. 1, fig. 8. Bassett '64, p. 68

Cynipid. Andricus ventricosus Bass.

Globose, usually with a produced, curved apex, single or clustered twig gall, green turning to brown, on Q. platanoides, Q. imbricaria. Fig. 64, 6, 7. Beutm. '09, p. 33

Cynipid. Disholcaspis bassetti Gil.

(*d*) Not globular or conical

Very hard, ovate or elongate, woody, polythalamous twig swelling on Q. chrysolepis. Fig. 65, 9–13. Beutm. '09e, p. 281
Cynipid. Compsodryoxenus brunneus Ashm.

Globo-cylindrical, cellular twig galls attached by a broad base and with cuplike expansions, yellowish or greenish brown, frequently black and dirty, diameter 6 mm, on scrub oak. Gillette '93, p. 30, Beutm. '09a, p. 39
Cynipid. Disholcaspis perniciosa Bass.

Ovate or budlike, monothalamous, green or red, fleshy gall on trunks of young trees or stems of very young shoots, length 5 to 6 mm, diameter 3 to 3.25 mm, on Q. rubra, Q. velutina. Beutm. '11e, p. 211
Cynipid. Andricus rugulosus Beutm.

(4) Woody, a central kernel and the outer substance of the gall chambered, clustered

Clustered, elongate, fusiform, monothalamous twig galls, the interior corky, filamentaceous, length 1.5 to 2 cm, diameter 1 cm, on Q. rubra, Q. cinerea Q. coccinea. Pl. 3, fig. 2. Bassett '64, p. 679
Cynipid. Andricus formosus Bass.

b Galls distinctly woody, with the structure of typical bullet galls and clustered in compact and characteristic masses about the supporting twig

Clustered, compressed, somewhat fig-shaped, yellowish brown twig galls covered with a feltlike substance, on Q. virginiana. Fig. 64, 2–5. Beutm. '09a, p. 40
Cynipid. Woolly fig gall, Disholcaspis ficigera Ashm.

Closely compressed clusters of twig galls covered with a rust-colored, velvety substance, spongy internally, reddish brown, length of masses 25 to 50 mm, diameter 16 to 38 mm, on Q. macrocarpa, Q. minor and Q. chapmani. Fig. 63, 10, 11. Beutm. '09a, p. 41.
Cynipid. Disholcaspis spongiosa Karsch

Clustered, dark reddish brown twig gall, the mass resembling an irregular nubbin of red dent corn, on Q. virginiana. Bassett '00, p. 329
Cynipid. Loxaulus spicatus Bass.

Globose twig enlargement, diameter 12 mm, composed of a series of monothalamous, brown, wedge-shaped, closely fitted cells, on Q. bicolor, Q. macrocarpa. Pl. 3, fig. 5. Osten Sacken '62, p. 254
Cynipid. Lobed oak gall, Cynips strobilana O. S.

Rounded or crown-shaped, monothalamous, pale green twig gall, soft when fresh, becoming hard after drying, thick-walled, diameter 6 to 12 mm, length 8 to 12 mm, on Q. palustris, Q. aquatica. Beutm. '07, p. 464
Cynipid. Andricus coronus Beutm.

c Galls in compact cluster around the twig but bladderlike and not woody as in the last group

Numerous soft, thin-shelled, yellow, red or brown twig galls frequently closely pressed together and somewhat resembling figs, on Q. alba, Q. prinoides and Q. prinus. Fig. 66, 84, 1, 2. Beutm. '09d, p. 244
Cynipid. Oak fig gall, Biorhiza forticornis Walsh

d Galls on twigs, consisting of fibrous material which conceals one or more cells containing larvae

(1) Cells large, solitary or clustered

Elongate or oblong, woody, tubelike twig gall resembling a date seed, sessile on the branch and covered with long, brownish yellow wool, length 2 cm, diameter 5 to 7 mm, on Q. chrysolepis. Ashm. '97, p. 117

Cynipid. Woolly tube gall, Andricus dasydactyli Ashm.

Elongate, irregular, hard, woody cell, broadly attached to the twig and covered with a compact mass of white, woolly substance sometimes tinged with red or brown, length 15 to 20 mm, diameter 12 to 20 mm, on Q. minor. Beutm. '09f, p. 248

Cynipid. Andricus aciculatus Beutm

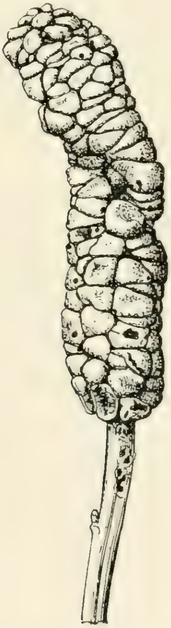

Fig. 66. Oak fig gall, Biorhiza forticornis Walsh. (Original)

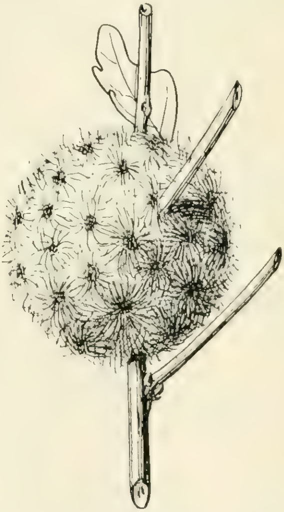

Fig. 67. Wool sower, Andricus seminator Harr. (Original)

(2) Cells small, numerous, massed in a cluster beneath the fibers

Globular white, pinkish marked, woolly growth containing seedlike grains and occurring on twigs in June, diameter 2.5 to 4 cm, on Q. alba. Fig. 67. Walsh '70, p. 71

Cynipid. Wool sower, Andricus seminator Harr.

Among the fibers of fresh Andricus seminator galls

Itonid. Cecidomyia sp.

Round, woolly twig gall containing seedlike grains and closely resembling that of C. seminator Harr., on Q. nigra. Osten Sacken '62, p. 256

Cynipid. Callirhytis operator O. S.

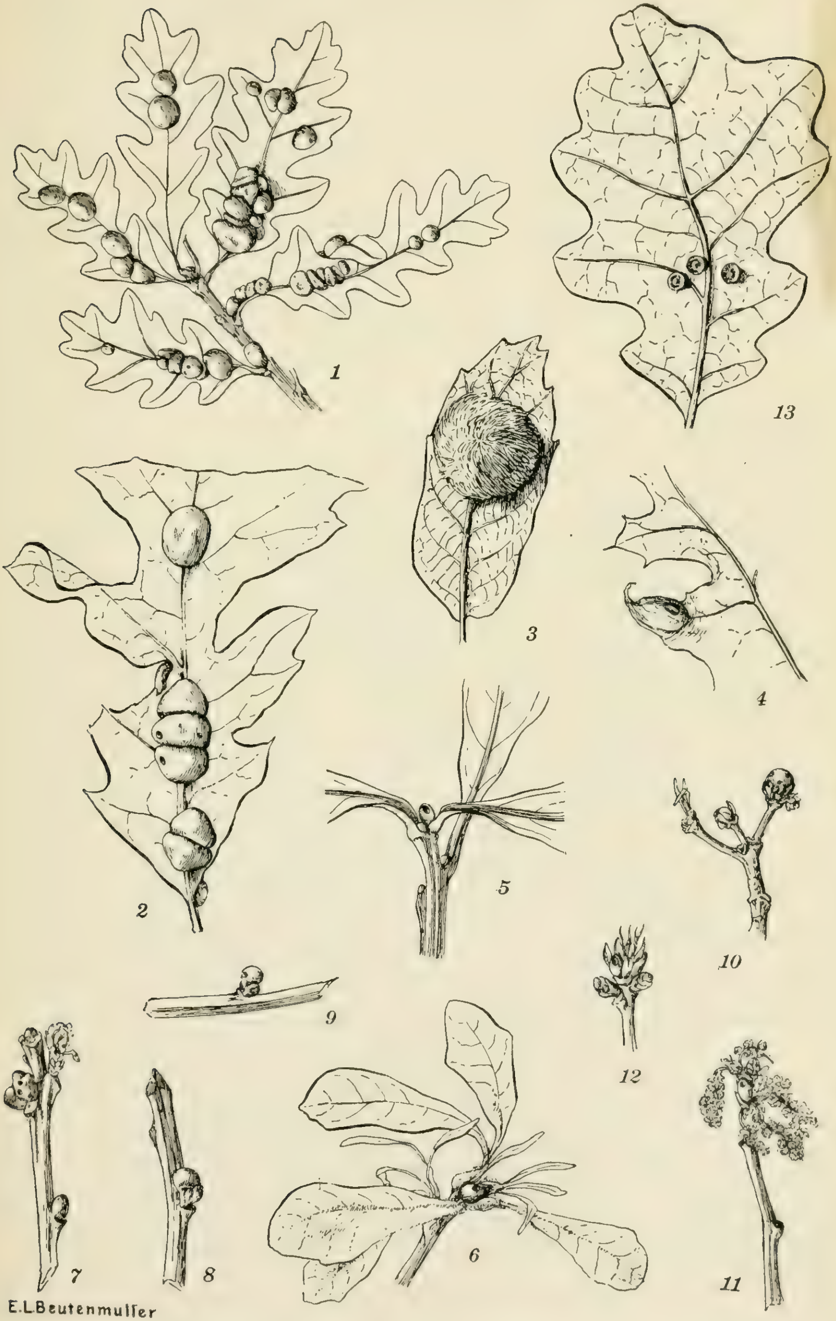

Fig. 68. Dryophanta galls. 1, 2. D. eburnea Bass. 3. D. nubila Bass. 4. D. notha O. S. 5, 6. Threaded oak gall, D. pallipes Bass. 7–10. D. clarkei Bass. 11, 12. Hard oak bud gall, D. gemula Bass. 13. D. discus Bass. (After Beutm., Am. Mus. Nat. Hist.)

Ovate, haired twig gall consisting of 20 to many irregularly fusiform cells, apically haired, forming gray, brown masses, on Q. macrocarpa. Karsch '80, p. 291

Cynipid. Andricus setifer Karsch

Large twig gall composed of a woolly mass having a diameter of 85 to 60 mm and encircling twigs 5 mm in diameter, each mass composed of from few to many cells and covered with long, white wool. Beutm. '13, p. 132

Cynipid. Callirhytis furnessae Weld.

Irregular, globose, brownish yellow twig gall, smooth above, tomentose below, length 2.5 cm, diameter 12 mm. Mayr. '05, p. 571

Cynipid. Andricus bonanseae Mayr.

Woolly twig gall composed of numerous haired cells, white, blended with rose and later rusty red, diameter 1 to 3 cm. Mex. Trotter '11, p. 127

Cynipid. ? Callirhytis sp.

5 *Gall consisting of one or more larval cells or capsules in a leaf bud*

a Hard cell or cells surrounded by a number of modified leaves. *See also* b, c, d on pages 75 and 76.

(1) Cells surrounded by a few threadlike bodies

Oblong, oval, thin-shelled, blackish brown galls among the thrifty young buds and surrounded by six or more long, brown, threadlike bodies, length 2.5 mm, diameter 1.5 mm, on Q. alba. Fig. 68, 5, 6. Bassett '00, p. 327

Cynipid. Threaded oak gall, Dryophanta pallipes Bass.

(2) Cells surrounded by a rosette of linear leaves

Conical, axillary leaf bud gall covered with a dense, rosettelike cluster of aborted leaves, cell oval, length 3 mm, on Q. prinoides. Fig. 69, pl. 3, fig. 3. Bassett '64, p. 688

Cynipid. Oak rosette gall, Cynips frondosa Bass.

Dormant bud galls covered with short fuzzy abortive leaflets and occurring in clumps on trunks of Spanish oak (Q. digitata) and blue jack oak (Q. brevifolia). Beutm. '17, p. 349

Cynipid. Dryophanta floridensis Beutm.

Urn-shaped bud gall with numerous lanceolate, leaflike spines, diameter 12 to 18 mm, middle cell brownish, length 3.5 to 4 mm, diameter 2 to 2.5 mm, on Q. prinoides, Q. alba and Q. macrocarpa. Pl. 1, fig. 3. Ashm. '81, p. XII

Cynipid. Leafy oak gall, Andricus foliatus Ashm.

Small, brown, acorn-shaped gall issuing from a bud axil and surrounded basally by small, narrow, dense leaflets, the cell ovate, diameter 3.75 by 2.5 mm, on Q. obtusiloba. Ashm. '87, p. 136

Cynipid. Andricus stropus Ashm.

(3) Several cells surrounded by a rosette of aborted leaves

A rosette cluster of dense, narrow leaflets springing from a bud, cells, length 3 mm, diameter 2 mm, on Q. macrocarpa Ashm. '87, p. 136

Cynipid. Andricus topiarius Ashm.

Conical, axillary leaf bud gall covered with a dense, rosettelike cluster of aborted leaves, cell oval, length 3 mm, on Q. prinoides. Fig. 68, pl. 3, fig. 3. Bassett '64, p. 688

Cynipid. Oak rosette gall, Cynips frondosa Bass

Polythalamous bud galls surrounded by a thick, compact leaf cluster, on Q. lobata. Fullaway '11, p. 353

Cynipid. Andricus wiltzae Fullw.

Irregularly rounded or ovate, woody, polythalamous swellings with aborted leaves, on Q. minor. Fig. 85, 8. Beutm. '10c, p. 120

Cynipid. Neuroterus obtusilobae Karsch

b A hard cell in the bud and no circle of modified leaves

Rounded or oval, monothalamous, blackish, flower or leaf bud gall, length 2.5 mm, diameter 1.25 mm, on Q. prinoides. Fig. 68, 11, 12. Beutm. '11d, p. 358

Cynipid. Hard oak bud gall, Dryophanta gemula Bass.

Smooth, thin-shelled, globular gall, diameter 2 to 3 mm, arising from a bud and occasionally inclosed by bud scales, on Q. laurifolia. Ashm. '87, p. 141

Cynipid. Andricus calycicola Ashm.

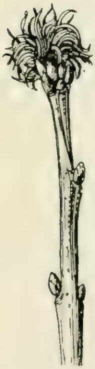

Fig. 69. Oak rosette gall, Cynips frondosa Bass. (Original)

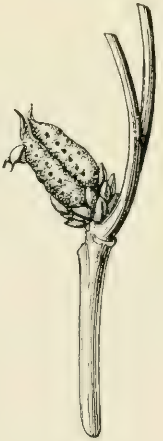

Fig. 70. Neuroterus minutus Bass., snowing aborted leaves. (Original)

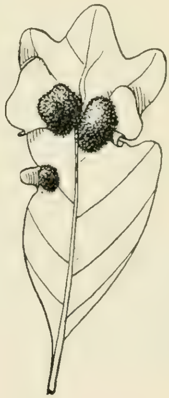

Fig. 71. Neuroterus minutus Bass., showing several galls on a slightly deformed leaf. (Original)

c A soft capsule in the bud and no modified leaves

A smooth, reddish brown vesicle in the center of the bud of Q. alba and surrounded at the base by bud scales, color pale greenish brown, on Q. alba, Q. bicolor, Q. prinoides, Q. platanoides and Q. macrocarpa. Fig. 81, 4–9. Beutm. '10e, p. 131

Cynipid. Soft oak bud gall, Neuroterus vesiculus Bass.

Reddish vesicles on the terminal growing point of buds and bud scales. Triggerson '14, p. 4

Cynipid. Cynips erinacei Mayr.[1]

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[1] The better known agamic form is Philonix erinacei Mayr., see p. 94

Polythalamous, small, round, brown, thin-walled bud gall, diameter 3 mm, on Q. alba, Q. minor, resembles gall of D. vesiculus. Fig. 68, 7–10. Beutm. '11d, p. 368

Cynipid. Dryophanta clarkei Bass

Conical bud gall, length 8 to 12 mm, diameter 4 to 5 mm, on Q. parvifolia. Ashm. '87, p. 137

Cynipid. Andricus cinnamomeus Ashm.

Small, thin, completely concealed capsules occurring singly in buds of Q. undulata. Gill. '92, p. 247

Cynipid. Andricus cellularius Gill.

d Capsules in the bud, blasting it completely or so that only a few deformed and imperfect leaves appear

Polythalamous, small, round, brown, thin-walled bud gall, diameter 3 mm, on Q. alba, Q. minor, resembles gall of D. vesiculus. Fig. 69, 7–10. Beutm. '11d, p. 368

Cynipid. Dryophanta clarkei Bass.

A minute, round, thin-shelled gall in apparently normal, young buds of post oak, diameter 1 mm. Beutm. '13, p. 247

Cynipid. Dryophanta cressoni Beutm.

Globose, whitish, smooth and glabrous apically, polythalamous bud gall, within whitish, spongy, diameter 22 mm, on Q. agrifolia. Fullaway '11, p. 358

Cynipid. Callirhytis maculipennis Kieff.

Oblong, oval, longitudinally ribbed, brown galls without a distinct cell, occurring in groups of two or three and issuing from bud axils, on Q. cinerea. Ashm. '87, p. 142

Cynipid. Jumping ribbed gall, Andricus saltatus Ashm.

Clustered, globular, woolly bud capsules, apical or axillary, the clusters with a diameter of 6 to 8 mm. Beutm. '10c, p. 132

Cynipid. Neuroterus congregatus Gill.

Rounded, monothalamous bud gall, diameter 10 mm, yellowish, woolly, within a thin-shelled cell with a diameter of 4 mm, on Q. wislizeni. Fullaway '11, p. 359

Cynipid. Callirhytis eriophora Kieff.

Globose, opaque, yellowish, sparsely brown-spotted, glabrous apically, monothalamous bud gall, diameter 8 mm, within spongy and a thick-shelled cell, the latter with a diameter of 5 mm, on Q. agrifolia. Fullaway '11, p. 359

Cynipid. Callirhytis clarimontis Kieff.

Oval bud gall, smooth, glabrous, ligneus, length 13 mm, diameter 11 mm, apically with a thin, longitudinally striated, thick and more or less bent point about 8 mm long and 1.5 mm thick, on Q. chrysolepis. Fullaway '11, p. 360

Cynipid. Callirhytis bakeri Kieff.

Irregular, oval bud gall, the leaflets hardly extending from the buds. Pl. 16, fig. 5. Thompson '15, p. 98

Acarid. Eriophyes sp.

Globose, yellowish brown, polythalamous bud gall with numerous irregular, longitudinal and transverse ridges or tuberosities, diameter 40 mm, apically with a conical spur and having a length of 5 mm, internally numerous oval cells, on Q. chrysolepis. Fullaway '11, p. 361

Cynipid. Callirhytis rossi Kieff.

Globose, monothalamous, thin-shelled bud gall, green, turning brown or gray, imbedded in short, lanceolate, aborted leaves more or less concealing the gall, diameter 3 mm, on Q. platanoides. Beutm. '13f, p. 124

Cynipid. Andricus flavohirtus Beutm.

Globular or elliptical, grayish red, woody bud gall, the apex slightly pointed, length 10 to 14 mm, diameter 6 to 9 mm. Cal. Trotter '11, p. 113

Cynipid. ? Cynips sp.

Subglobose, monothalamous, yellowish bud gall, diameter 2 to 3 cm, diameter of cell 6 mm. Mex. Trotter '11, p. 127

Cynipid. ? Cynips sp.

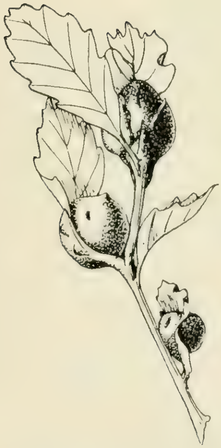

Fig. 72. Oak leaf stalk gall, Andricus petiolicola Bass. (Original)

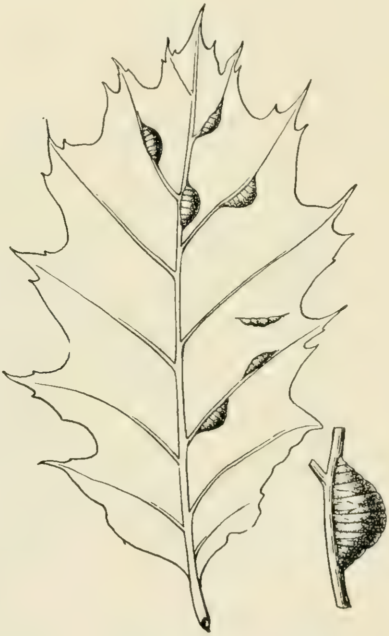

Fig. 73. Cecidomyia sp. Vein gall on oak. (Original)

Ovate bud gall, the surface with numerous reddish scales, length 10 to 12 mm, diameter 7 to 8 mm. Wash. Trotter '11, p. 113

Cynipid. Andricus sp.

Subglobose lateral bud gall, diameter 8 to 15 mm. Cal. Trotter '11, p. 111

Itonid. Cecidomyia sp.

Bud gall composed of a basal, oblate part with a height of 3 to 4 mm and a conico-pyramidal portion with a height of 10 to 12 mm and a diameter of 8 to 12 mm, the larval cell in the basal portion, resembles D. bassetti. Cal. Trotter '11, p. 109

Cynipid. ? Disholcaspis sp.

6 Galls of the leaves (in some cases the leaf itself is aborted and the gall issues from the twig or bud)

a Galls on the petiole of the leaf

Irregularly globose petiole gall about the size and color of a large, dry pea, on live oak. Ashm. '97, p. 123

Cynipid. Cynips sulcatus Ashm.

Globose, somewhat pubescent, monothalamous, brownish gall with a hard outer shell and a spongy interior, diameter 5 to 6 mm, on under surface of leaf on Q. alba. Fig. 97, 4. Beutm. '11d, p. 346

Cynipid. Dryophanta carolina Ashm.

Globular, below ochreous, not shining petiole leaf gall, internally brown, fibrous, with at least two cells, diameter 9 mm, on Q. arizonica. Beutm. '09a, p. 35

Cynipid. Disholcaspis arizonica Ckll.

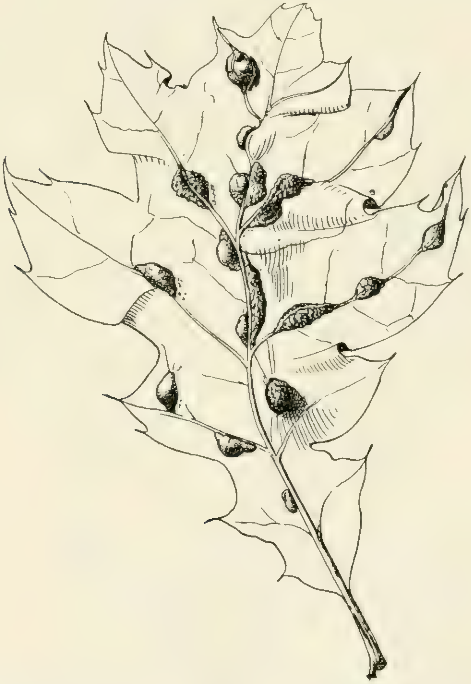

Fig. 74. Cecidomyia sp. on black oak, a2296. An older gall, possibly different from the preceding. (Original)

Polythalamous, irregular, clustered swellings of the petiole and midrib covered with pinkish pubescence, on Q. alba. Fig. 53, 3–5, 70, 71. Beutm. '10c, p. 127

Cynipid. Neuroterus minutus Bass.

Irregular swellings of the petiole, midrib or portions of the catkins dwarfing the growth, on Q. macrocarpa. Fig. 53, 8, 9. Beutm. '10c, p. 128

Cynipid. Neuroterus vernus Gill.

b Gall a swelling of the midvein or sometimes of the petiole (See also (13) p. 106, and (15) a, b, p. 110)

(1) Swellings abrupt

Globose or spindle-shaped, woody, green petiole or midrib gall on Q. alba, Q. prinus, Q. macrocarpa, Q. bicolor, Q. prinoides, Q. obtusiloba. Fig. 72. Bass. '63, p. 324

Cynipid. Oak leaf stalk gall, Andricus petiolicola Bass.

Polythalamous, midvein gall projecting on both surfaces, rounded beneath, conical above, length 19 to 22 mm, diameter 12 mm, on Q. alba. Pl. 1, fig. 1. Bass. '90, p. 80

Cynipid. Andricus cicatriculus Bass.

Irregular, polythalamous, reddish brown, woody thickening of the midvein or leaf and containing radiating larval cells, length 8 to 15 mm, diameter 5 to 6 mm, differs from both Andricus petiolicola and Callirhytis tumifica. Mex. Trotter '11, p. 131

Cynipid. ? Cynips sp.

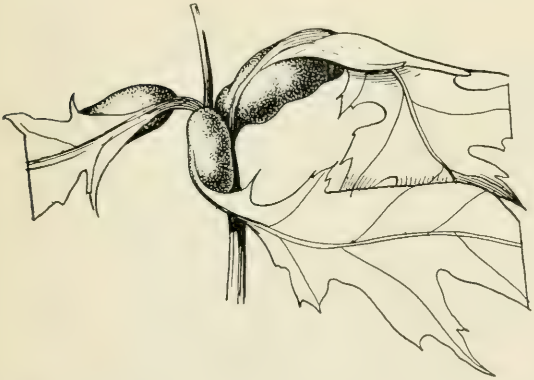

Fig. 75. Midrib tumor gall, Callirhytis tumifica O. S. (Original)

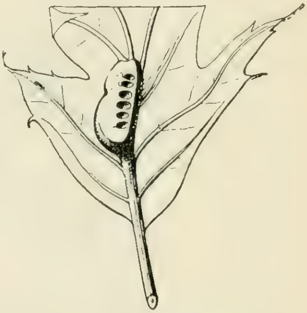

Fig. 76. Midrib tumor gall, Callirhytis tumifica O. S. Section showing arrangement of larval cells. (Original)

Soft, thin-shelled, red or brown vein galls frequently closely pressed together and somewhat resembling figs, on Q. alba, Q. prinoides and Q. prunus. Fig. 66, 84, 1, 2. Beutm. '09d, p. 244

Cynipid. Oak fig gall, Biorhiza forticornis Walsh

Small, rounded, polythalamous, midvein gall projecting equally on both surfaces, diameter 2 to 3 mm, on Q. parvifolia. Ashm. '87, p. 138

Cynipid. Callirhytis parvifoliae Ashm.

Globose, polythalamous, midvein gall near the base of the leaf, prominent on both surfaces, diameter 6 mm, cells radiating from a common center and not separable from woody fiber about them, on Quercus species. Bassett '90, p. 74

Cynipid. Callirhytis reticulata Bass.

Irregular, polythalamous, globose, fleshy gall occurring near the base of the leaf and projecting about equally above and below, diameter 4 to 7 mm. Ashm. '97, p. 116

Cynipid. Andricus morrisoni Ashm.

Globose, hard petiole gall projecting equally above and beneath, at first smooth, reddish brown, minutely pubescent, later turning black, within five longitudinal partitions, diameter 6 mm, on Q. obtusiloba. Ashm. '85, p. 299

Cynipid. Five-chambered oak gall, Andricus quinqueseptum Ashm.

Globose, clustered, monothalamous, midrib gall with a more or less distinct nipple apically and a long stem basally, brown when old, probably green when fresh, diameter 4 to 7 mm, stem 1 to 2.5 mm, resembles a huckleberry, on post oak. Beutm. '13, p. 247

Cynipid. Huckleberry oak gall, Cynips vacciniiformis Beutm.

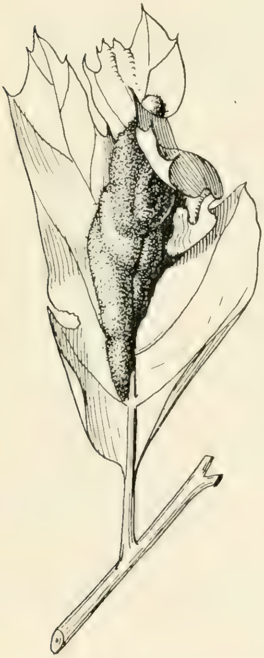

Fig. 77. Woolly fold gall. Cecidomyia niveipila O. S., leaf badly deformed. (Original)

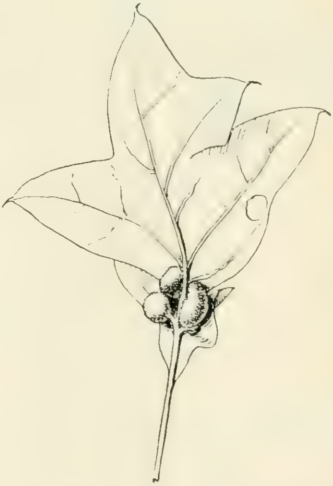

Fig. 78. Woolly fold gall, Cecidomyia niveipila O. S., leaf slightly deformed. (Original)

Globular, clustered, monothalamous, midrib gall, the diameter of individual galls 2 to 5 mm, on Q. undulata, Q. muhlenbergii, Q. prinoides. Stebb. '10, p. 31

Cynipid. Cynips caducus Walsh

Subglobular, straw-colored or brown, midrib galls, flattened next the leaf, within a larval cell with radiating fibers, diameter 4 to 6 mm, on Q. undulata. Fig. 68, 1, 2. Beutm. '11d, p. 348

Cynipid. Dryophanta eburnea Bass.

Rounded or elongate midrib swellings filled with oblong or elongate kernels, a few to 40; when young concealed in the tissues and bursting open in October, on Q. rubra, Q. velutina. Beutm. '13g, p. 131
Cynipid. Deciduous oak gall, Andricus decidua Beutm.

Irregularly rounded, oval or elongate, midrib or vein gall, sometimes deforming the entire leaf, green, turning brown and becoming woody when old, length 10 to 35 mm, diameter 10 to 15 mm, on Q. garryana. Beutm. '13d, p. 280
Cynipid. Neuroterus washingtonensis Beutm.

Fusiform ribbed or carinate mid or lateral vein folds on the under surface, length 6 to 8 mm, diameter 3 to 4 mm. Fig. 73, 74.
Itonid. Cecidomyia sp. a2296

Elongate, polythalamous, midrib swellings with the larval cells perpendicular to the surface of the leaf, length 18 mm, diameter 9 mm, on Q. ? undulata. Beutm. '10, p. 134
Cynipid. Neuroterus quercicola Dalla Torre

(2) Less abrupt and localized enlargements of midveins (more rarely of lateral veins and the petiole)

Midrib, polythalamous swellings mostly near the base of the leaf, some on the petiole, on Q. tinctoria. Fig. 75, 76. Osten Sacken '65, p. 356
Cynipid. Midrib tumor gall, Callirhytis tumifica O. S.

Irregular, elongate or globose enlargements of the midrib or terminal twigs, length 1.5 to 2.5 mm, diameter 4 to 12 mm, on Q. nigra, Q. rubra, Q. lobata. Fullaway '11, p. 362
Cynipid. Callirhytis nigrae O. S.

Irregular, polythalamous, midrib swellings often 2.5 cm long, 1.2 cm in diameter, on Q. tinctoria. Bassett '81, p. 105
Cynipid. Oak midrib gall, Andricus piger Bass.

Slight, fleshy swelling along the midrib, containing two or more small cells, diameter of latter 1.8 to 2 mm, on Q. laurifolia. Ashm. '87, p. 141
Cynipid. Callirhytis cellae Ashm.

Hard, woody, midvein or lateral vein galls, the leaf much wrinkled and deformed, length 18 mm, diameter 6 mm, on Q. macrocarpa. Beutm. '10c, p. 135
Cynipid. Neuroterus flavipes Gill.

Irregular, pustulelike, polythalamous petiole and midrib gall on Q. minor. Beutm. '10c, p. 133
Cynipid. Neuroterus gillettei Bass.

Subglobose, slightly depressed, monothalamous, smooth and, under the lens, squamose, grayish red vein gall, diameter 5 to 6 mm, height 3 to 3.5 mm. Mex. Trotter '11, p. 126
Cynipid. ? Cynips sp.

Spherical, monothalamous, smooth, with a slight, superficial roughness, reddish vein gall, occurs singly or in clusters and when in the latter, somewhat compressed, diameter 5 to 6 mm. Mex. Trotter '11, p. 123
Cynipid. Cynips sp.

Spherical, monothalamous, woody vein gall, the surface smooth, grayish, with minute, grayish warts, diameter 8 mm. Cal. Trotter '11, p. 118
Cynipid. ? Cynips sp.

Irregular, monothalamous or polythalamous thickenings of the mid or lateral veins occurring on both surfaces, diameter 3 to 4 mm. Mex. Trotter '11, p. 128

Cynipid. ? Cynips sp.

Pyriform or clavate, reddish vein galls, the expanded portion with a lateral ridge and longitudinal striations; within a larval cell, height 6 mm, diameter 4.5 mm. Cal. Trotter '11, p. 117

Cynipid. Andricus pistillaris Trott.

Narrow, dark purplish, fusiform, thin-walled swelling on the under side of the mid or lateral veins may contain two or more larvae, length 8 mm. Pl. 8, fig. 9. Felt '16d, p. 159

Itonid. Purple oak vein gall, Cincticornia podagrae Felt

Large, midrib fold with a conspicuous, white pubescence, the leaf frequently deformed. Fig. 77, 78, 79. Stebb. '10, p. 17

Itonid. Woolly fold gall. Cecidomyia niveipila O. S.

Elongate, pocketlike swellings along the midrib of round-leaved scrub oak, length 5 mm. Pl. 8, fig. 3. Felt '08e, p. 411

Itonid. Vein-pocket gall, Parallelodiplosis florida Felt

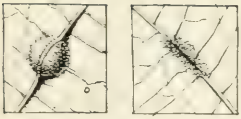

Fig. 79. Woolly fold gall, Cecidomyia niveipila O. S., early stages of two galls. (Original)

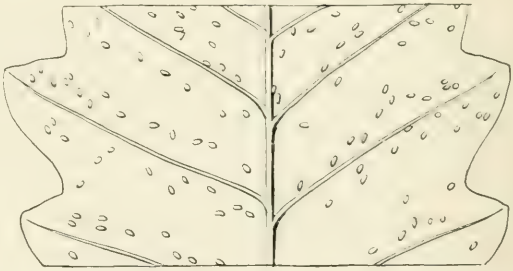

Fig. 80. Oak blister gall, Neuroterus papillosus Beutm. (Original)

Elongate fold gall close to the midrib on the under surface, length 12 mm, diameter 1 mm, on Quercus, possibly identical with the preceding.

Itonid. Cecidomyia oruca Walsh

Fusiform, thin-walled, striate, pale green vein swelling, length 5 mm, diameter 3 mm, on red oak. Pl. 8, fig. 4.

Itonid. Cecidomyia sp. a2728

Globose or blisterlike, monothalamous leaf vein swellings more distinct on the upper side and with a minute nipple on the lower surface, diameter 1 to 1.75 mm, on Q. alba and Q. macrocarpa. Fig. 81, 1. Beutm. '10c, p. 121

Cynipid. Neurotus niger Gill.

Hemispherical or subhemispherical, pale brown, minutely crackled vein gall, diameter 4 mm, height 2.5 mm, on Quercus sp. Fig. 107, 10. Beutm. '10c, p. 125

Cynipid. Neuroterus cockerelli Beutm.

Oval, thin-walled, monothalamous vein swellings covered with a dense, brown pubescence, on Q. alba. Fig. 53, 10. Beutm. '10c, p. 128

Cynipid. Neuroterus pallipes Bass.

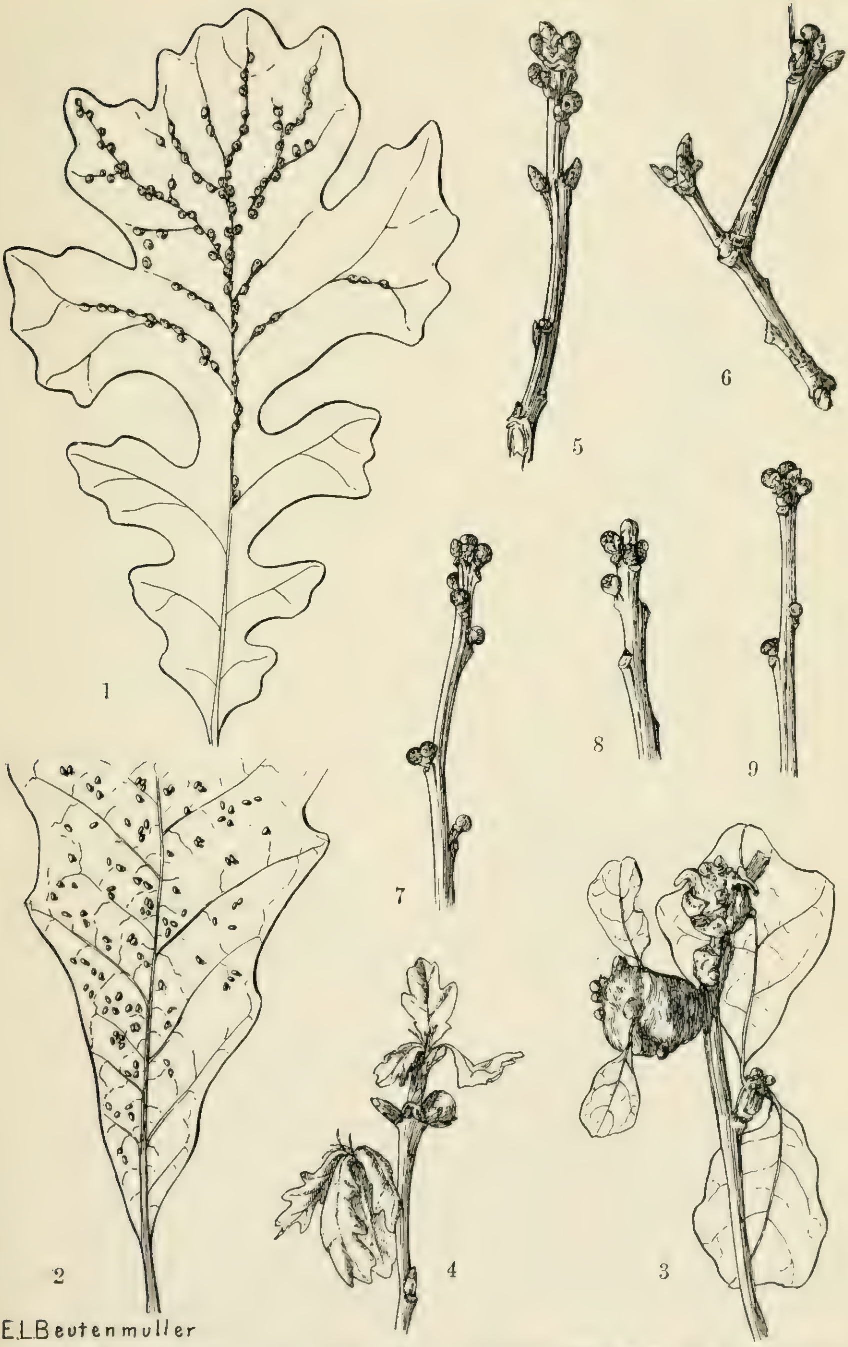

Fig. 81. Neuroterus galls. 1. N. niger Gill. 2. Gall of oak blister wasp, N. papillosus Beutm. 3. Gall of N. consimilis Bass. 4–9. Soft oak bud gall, N. vesiculus Bass. (After Beutm., Am. Mus. Nat. Hist.)

A slight circular, blisterlike swelling on the lateral veins, length 3 mm, diameter 1 mm, on Q. rubra. Felt '16d, p. 161
Itonid. Oak vein blister, Cincticornia americana Felt

Subglobose or fusiform, pale green, yellow margined leaf fold, mostly on under surface, length 3 to 7 mm, diameter 3 mm. Pl. 9, fig. 1.
Itonid. Cecidomyia sp. a1979

Gall, similar to, if not identical with the above. Pl. 9, fig. 2. Stebb. '10, p. 17
Itonid. Cincticornia majalis O. S.

(3) A whole leaf is swollen to form a fleshy, elongated gall

Very irregular, swollen mass originating from the midvein or the petiole of the leaf and involving the whole structure, green and succulent, later shriveling and drying, size variable, on Q. platanoides. Fig. 55. Beutm. '10c. p. 119
Cynipid. Noxious oak gall, Neuroterus noxiosus Bass.

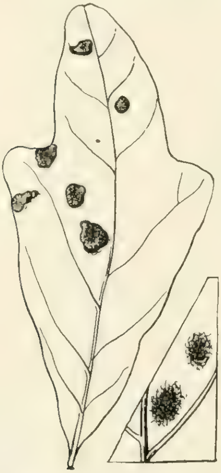

Fig. 82. Eriophyes sp., showing upper and lower surface of leaf. (Original)

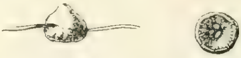

Fig. 83. Oak wart gall, Andricus futilis Bass. in profile and sectioned. (Original)

Subglobose, polythalamous, reddish brown leaf gall, entirely deforming small leaves, diameter 4 to 5 mm. Cal. Trotter '11, p. 114
Cynipid. ? Cynips sp.

c Galls involving or attached to the lamina of the leaves

(1) Little or no thickening of the leaf tissues. *See also* (2-3), (4-5), (6), (7-8), (9-10), (11), (12), (13), (14), (15-16), (17), (18), on pages 88, 90, 92, 94, 95, 102, 104, 106, 109, 110, 115 116 respectively.

(*a*) Small, blisterlike or pustular swellings of the leaf blade

Globose, thin-walled, monothalamous leaf galls, single or clustered, showing on both surfaces, diameter 5 mm, on live oak. Fig. 107, 6. Beutm. '10c, p. 122
Cynipid. Neuroterus howertoni Bass

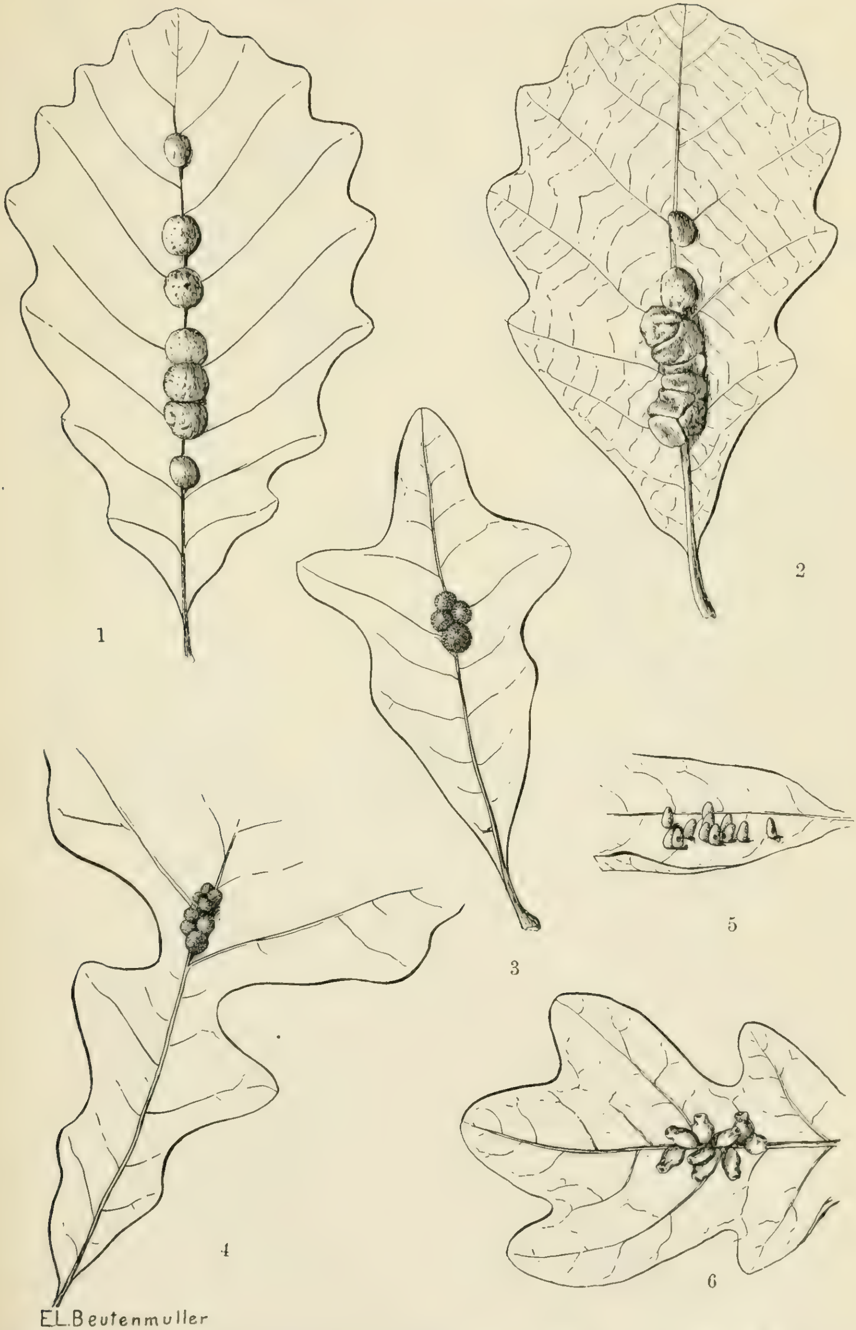

Fig. 84. 1, 2. Oak fig gall, Biorhiza forticornis Walsh on dwarf chestnut oak. 3, 4. B. mellea Ashm. 5. Xystoteras volutellae Ashm. 6. Bell-shaped oak gall, Zopheroteras vaccinii Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Elongate, oval, blisterlike leaf swelling without a nipple, on the under side, length 1 mm, diameter .75 mm, on Q. platanoides. Fig. 80, 81, 2. Beutm. '10c, p. 121

Cynipid. Oak blister wasp, Neuroterus papillosus Beutm.

Subelliptical, blister leaf gall, length 2 to 2.5 mm. Cal. Trotter '11, p. 108

Cynipid. Neuroterus sp.

A broadly yellow-margined, circular, blister leaf gall, diameter 3 mm, on Q. coccinea. Felt '16d, p. 154

Itonid. Oak yellow-spot, Cincticornia serrata Felt

A variable brown, irregularly oval, pustulate leaf swelling, diameter 5 to 6 mm, on Q. velutina, Q. rubra. Pl. 8, fig. 7. Felt '16d, p. 156

Itonid. Oak blister midge, Cincticornia pustulata Felt

An irregularly oval, pustulate swelling showing equally on both leaf surfaces but with no nipple, diameter 5 to 6 mm, on Q. rubra, Q. velutina. See plate 8, figure 8 for similar galls. Felt '16d, p. 157

Itonid. Cincticornia simpla Felt

Irregularly oval, pustulate leaf swelling showing equally on both surfaces but with no nipple, diameter 5 to 6 mm, on Q. velutina. Felt '16d, p. 168

Itonid. Cincticornia sobrina Felt

A slight, circular, blisterlike swelling of the lateral veins, length 3 mm, diameter 1 mm. Felt '08e, p. 380, 381

Itonid. Oak vein blister, Cincticornia americana Felt

A flat, relatively inconspicuous, presumably blister gall on Q. rubra. Felt '16d, p. 155

Itonid. Cincticornia quercifolia Felt

Blister leaf gall, inconspicuous, greenish, diameter 4 to 5 mm, on Q. agrifolia

Itonid. Cecidomyia sp. a2905

(*b*) Superabundant leaf hairs (erineum) or more or less distinct dimples

A yellowish green dimple, convex on the upper surface of the leaf, lined within with whitish or brownish hairs, on Q. alba. Chad, '08, p. 142

Acarid. Eriophyes sp.

Very small, pocket galls, crowded on the upper surface of the leaf, on Q. plantanoides. Chad. '08, p. 143

Acarid. Eriophyes sp.

Galls on the leaves of burr oak, Q. macrocarpa. Parrott et al. '06, p. 289

Acarid. Eriophyes querci Garm.

Deformation of leaves on the margin, on Q. minor. Chad. '08, p. 142

Acarid. Eriophyes sp.

A large, greenish yellow dimple, slightly convex above, beneath filled with a dense, brown pubescence, on Q. macrocarpa. Chad. '08, p. 142

Acarid. Eriophyes sp.

Greenish or reddish elevations on the upper surface, the concavity below nearly filled with yellowish brown hairs, on Q. marilandica. Fig. 82.

Acarid. Eriophyes sp.

Brown erineum on the under side of the leaves, on Q. rubra. Chad. '08. p. 143

Acarid. Eriophyes sp.

Large patches of dense, brown hairs on the under side of the leaf, on Q. coccinea. Chad. '08, p. 142

Acarid. Eriophyes sp.

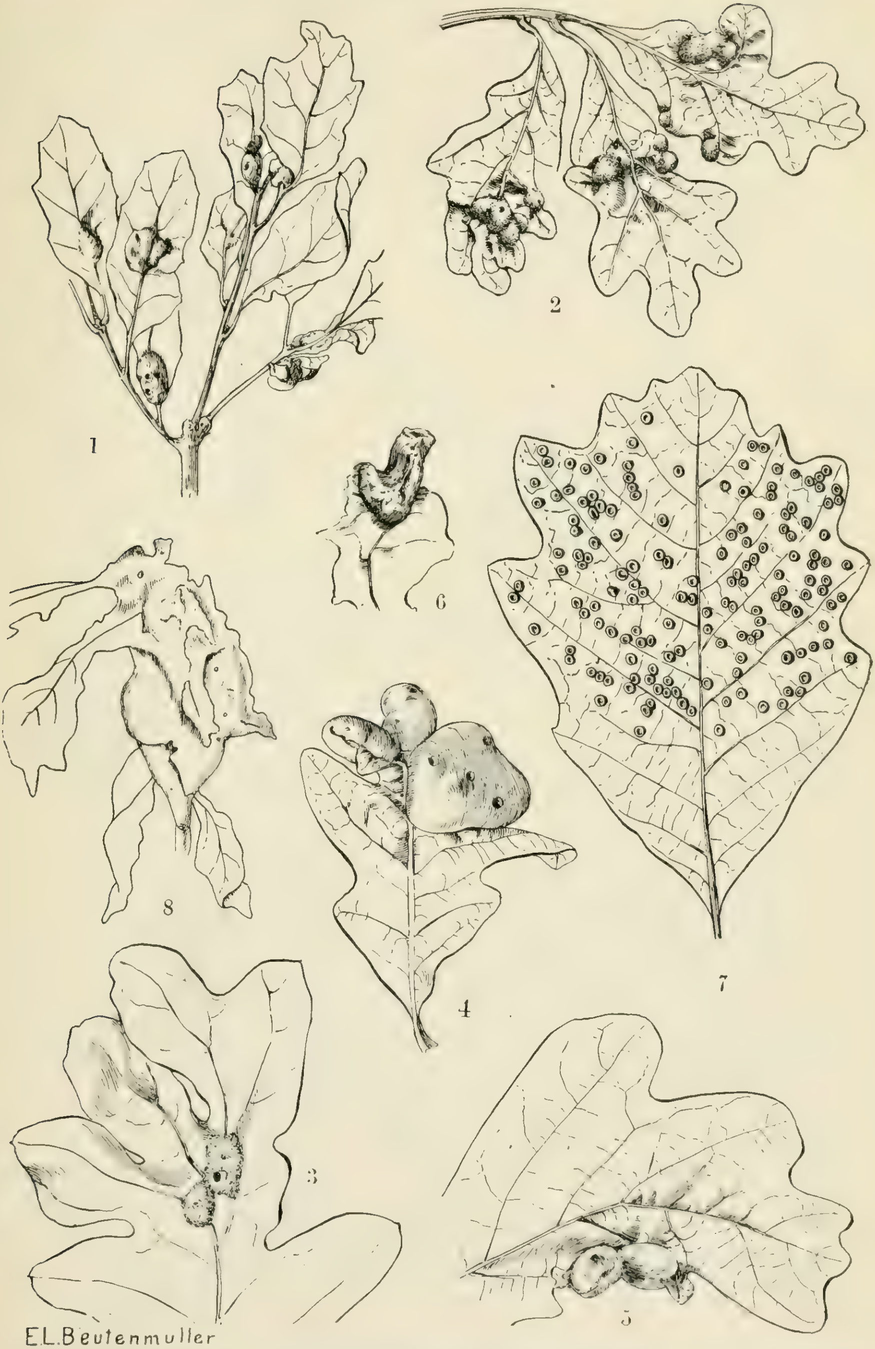

Fig. 85. Neuroterus galls. 1. Gall of N. fragilis Bass. 2, 3. Gall N. irregularis O. S. 4-6. Gall of N. majalis Bass. 7. Oak button gall, N. umbilicatus Bass. 8. Gall of N. obtusilobae Karsch. (After Beutm., Am. Mus. Nat. Hist.)

Velvety red erineum on the under side of the leaf, the younger portions greenish, on Q. velutina. Chad. '08, p. 143

Acarid. Eriophyes sp.

A snuff-brown erineum in large patches on the under side of the leaf of Q. nana. Chad. '08, p. 142

Acarid. Eriophyes sp.

An ashen erineum in the angles of the veins and spreading along them, mostly on the under side of the leaves, on Q. palustris, Q. texana, Q. velutina. Chad. '08, p. 152

Acarid. Eriophyes sp.

Larvae on a grayish green erineum, on Q. utahensis

Itonid. Cecidomyia sp.

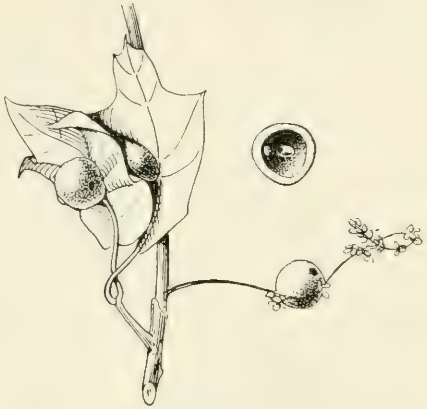

Fig. 86. Succulent oak gall, Dryophanta palustris O. S. One gall in section showing loose cell. (Original)

(2) Blister above lamina, woolly gall beneath

Globose leaf gall, smooth above, thickly covered with white wool below, single or confluent, diameter 1.5 to 3.5 mm, on Q. alba and Q. platanoides. Beutm. '10c, p. 123

Cynipid. Oak flake gall, Neuroterus floccosus Bass.

(3) Rounded gall with several cells imbedded in the lamina of the leaf

Small, slightly flattened, green leaf gall projecting from both surfaces, hollow, containing two or three oblong, filament-suspended cells, diameter about 3 mm, on Q. alba. Fig. 83, pl. 2, fig. 3. Osten Sacken '61, p. 63

Cynipid. Oak wart gall, Andricus futilis Bass.

Round, flattened leaf gall projecting on both surfaces, red above, yellowish below, diameter about 3 mm, on Q. coccinea, Q. prinus. Pl. 2, fig. 6. Osten Sacken '61, p. 64

Cynipid. Oak nipple gall, Andricus papillatus O. S.

Small, irregular, hard swellings on both sides of the leaf and concolorous, diameter 4 mm, on Q. rubra. Osten Sacken '61, p. 66

Cynipid. Callirhytis modestus O. S.

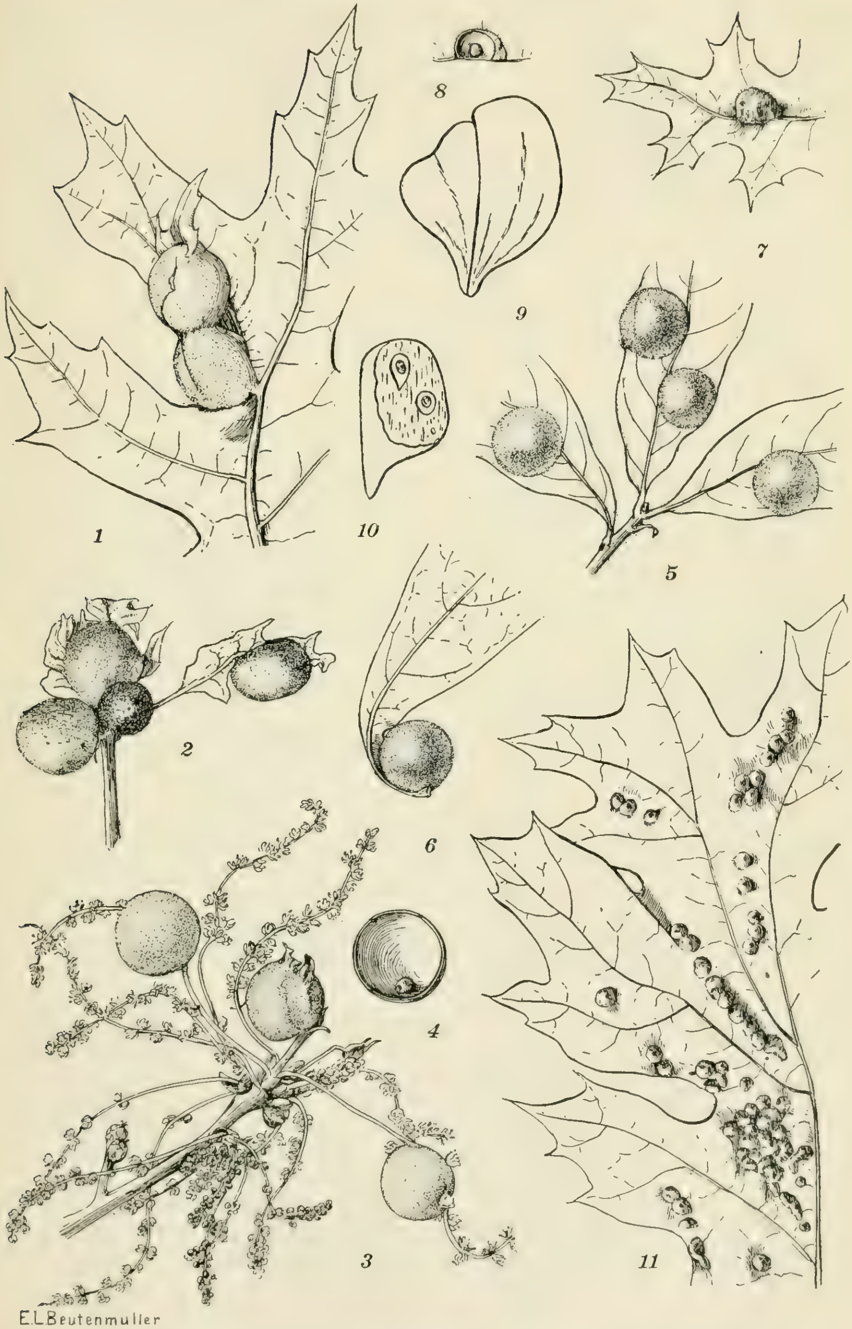

Fig. 87. Dryophanta galls. 1–4. Succulent oak gall, D. palustris O. S. 5. D. laurifoliae Ashm. 6. D. aquaticae Ashm. 7, 8. Callirhytis saccularius Bass. 9, 10. Dryophanta radicola Ashm. 11. D. papula Bass. (After Beutm., Am. Mus. Nat. Hist.)

(4) Galls making a sort of thickened and elevated area in the lamina

(*a*) The platform is formed of crowded, monothalamous galls

Papillose or conelike, clustered, small leaf galls projecting unequally and usually crowded, on Q. rubra, Q. tinctoria and Q. coccinea. Fig. 87, 11. Beutm. '11d, p. 360

Cynipid. Dryophanta papula Bass.

Globular, single or clustered leaf gall covered with minute, warty pubescent dots, monothalamous, fleshy, on the upper surface, diameter 2.5 to 3.75 mm, on Q. minor. Fig. 84, 3, 4. Beutm. '09d, p. 245

Cynipid. Biorhiza mellea Ashm.

(*b*) The platform is made by a single polythalamous gall

Flattened, polythalamous leaf galls projecting from both surfaces of the leaf diameter 6 to 24 mm, the upper and lower surfaces resembling a honey comb, on Q. tinctoria. Bassett '90, p. 87

Cynipid. Honeycomb leaf gall, Neuroterus favosus Bass.

Irregular, somewhat flattened, polythalamous, yellowish, pithy leaf galls, on Q. minor and Q. alba. Fig. 85, 2, 3. Beutm. '10c, p. 134

Cynipid. Neuroterus irregularis O. S.

Flattened, often very irregular, green, succulent leaf galls, horizontal diameter 6 to 25 mm, vertical diameter 6 to 9 mm, on Q. alba. Bassett '64, p. 682

Cynipid. Dolichostrophus majalis Bass.

Pale yellowish green, irregular, polythalamous leaf galls, usually in the midrib, on Quercus species. Fig. 85, 1. Beutm. '10c, p. 133

Cynipid. Neuroterus fragilis Bass.

Globose or subglobose, irregular, reddish, wrinkled leaf gall, diameter 3 to 4 mm, on red oak. Pl. 9, fig. 3. Felt '16d, p. 164

Itonid. Oak pill gall, Cincticornia pilulae Walsh

Gall similar to that of Cincticornia pilulae and possibly identical, apparently southern. Osten Sacken '62, p. 200. Felt '16d, p. 167

Itonid. Cincticornia symmetrica O. S.

Gall similar to, though much smaller than that of Cincticornia pilulae. Felt '15e, p. 157

Itonid. Dasyneura florida Felt

(5) Gall spherical, semispherical or conical, usually succulent and consisting of a wall inclosing a chamber in which the larval cell lies free. Some of these galls are loosely attached to the leaf, though more often they are imbedded in the blade.

(*a*) Gall globular

Globose, succulent, hollow leaf, bud and catkin gall containing a white, free, globular kernel, green, sometimes red-tinged, diameter 5 to 12 mm, on various oaks. Fig. 86, 87, 1–4. Beutm. '11d, p. 361

Cynipid. Succulent oak gall, Dryophanta palustris O. S.

Globose, hollow, plum-colored leaf gall, similar to that of D. palustris and developing equally upon both leaf surfaces; within a small, free cell, on Q. aquatica. Fig. 87, 6. Beutm. '11d, p. 363

Cynipid. Dryophanta aquaticae Ashm.

Gall similar to that of D. palustris, except that it projects about equally on both surfaces of the leaf, length 5 to 6.25 mm, diameter 3 to .75 mm, on Q. laurifolia. Fig. 87, 5. Beutm. '11d, p. 362

Cynipid. Dryophanta laurifoliae Ashm.

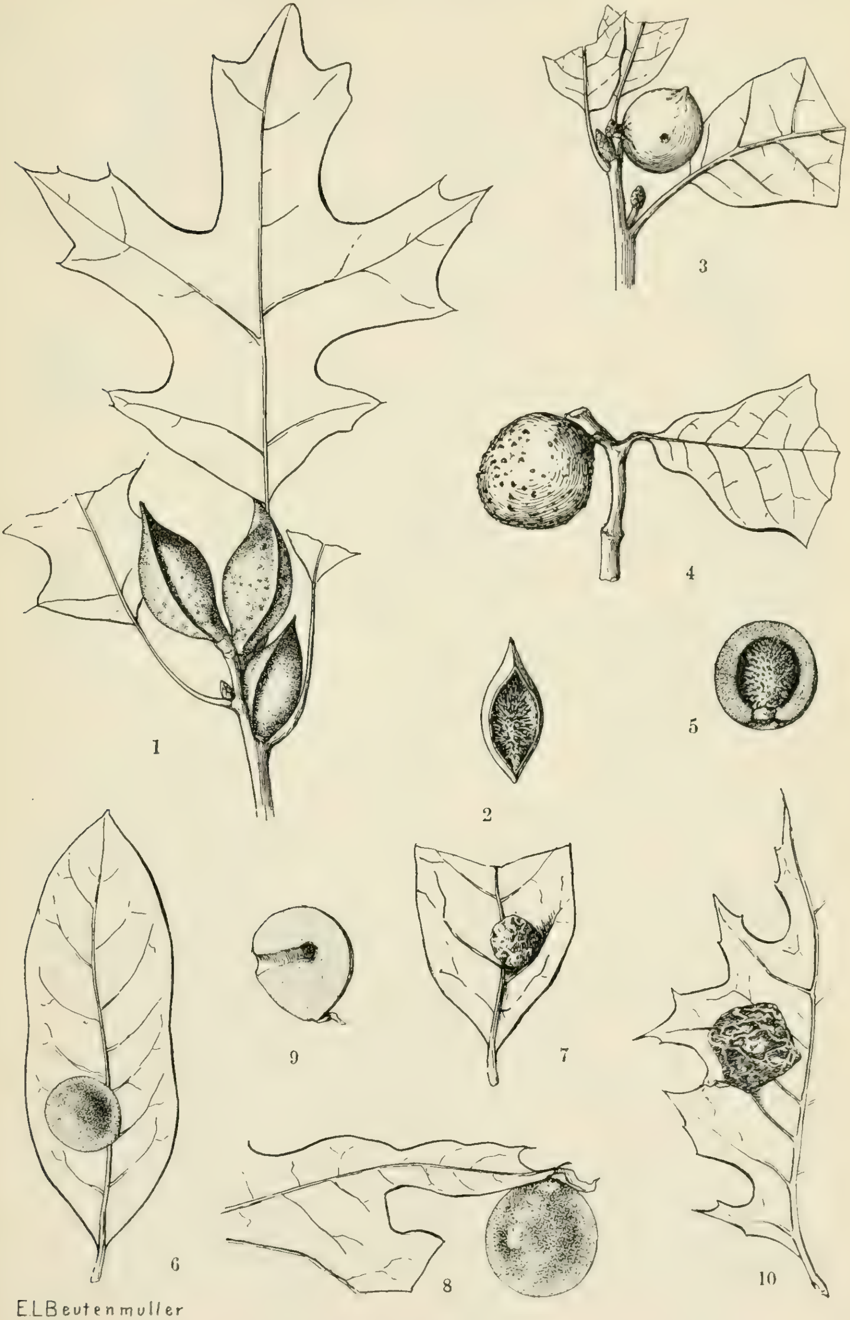

Fig. 88. Oak apples. 1, 2. Keeled oak apple, Amphibolips tinctoriae Ashm. 3–5. A. globulus Beutm. 6, 7. A. racemaria Ashm. 8–10. Translucent oak gall, A. nubilipennis Harr. (After Beutm., Am. Mus. Nat. Hist.)

Globose, succulent leaf gall with a loose, whitish kernel similar to that of Dryophanta aquaticae but much smaller, on Q. catesbaei. Beutm. '11d, p. 365

Cynipid. Dryophanta quercifoliae Ashm.

Globose, somewhat roughened, fuzzy, thick-celled leaf galls closely resembling those of D. palustris, diameter 6.5 mm to 9.5 mm, on red oak and scarlet oak. Beutm. '11d, p. 364

Cynipid. Dryophanta liberaecellulae Gill.

Globose, succulent, yellowish green, hollow galls containing a free cell and attached to the vein on the under side of the leaf of Q. laurifolia, diameter 1.5 mm, height 2.5 mm. Beutm. '11d, p. 365

Cynipid. Dryophanta confusa Ashm.

(*b*) Hemispherical or conical, attached to the under surface of the leaf

Subglobose, greenish gray, somewhat longitudinally ribbed, rugose, sessile galls; internally, with a loose kernel, diameter 4 mm, height 3.25 mm, on Q. cinerea. Fig. 99, 11, 12. Beutm. '11d, p. 367

Cynipid. Dryophanta cinereae Ashm.

Hemispherical, pouchlike, green leaf galls on the under surface, diameter 5 mm, walls thin, within a free, oval larval cell, on Q. coccinea. Fig. 87, 7, 8. Bassett '90, p. 76

Cynipid. Callirhytis saccularius Bass.

Single or clustered, conical, bluish gray, monothalamous leaf galls, height 3 to 3.5 mm, diameter 2.5 mm, on Q. macrocarpa. Fig. 84, 5. Beutm. '09d, p. 256

Cynipid. Xystoteras volutellae Ashm.

(6) Succulent, solid, spherical galls, usually firmly attached to the leaf blade

Globular or ovate, green, sometimes tinged with pink, succulent, translucent leaf gall, diameter 6 to 18 mm, on Q. rubra and Q. coccinea. Fig. 88, 8–10. Beutm. '09b, p. 60

Cynipid. Translucent oak gall, Amphibolips nubilipennis Harr.

Globose, rosy, juicy leaf galls on the upper surface, diameter 2 to 3 mm, on Q. alba. Beutm. '09d, p. 245

Cynipid. Biorhiza rubina Gill.

Globose, crisp, sour and succulent, green, becoming brown, leaf gall, internally with a reddish larval cell, diameter 8 to 10 mm, on Q. laurifolia in April and May. Fig. 88, 6, 7. Beutm. '09b, p. 61

Cynipid. Amphibolips racemaria Ashm.

Subglobular, thin-shelled leaf gall about the size of a pea, pointed at opposite poles, on Q. douglasii. Fullaway '11, p. 353

Cynipid. Andricus brunneus Fullw.

Subhemispherical, brown, slightly nippled, monothalamous gall on the under side of the leaf, diameter 1.75 mm, on black oak, probably Q. velutina. Pl. 13, fig. 8. Felt '16d, p. 160

Itonid. Cincticornia globosa Felt

Globose gall, diameter 4 mm, on under side of running oak leaf. Felt '11k, p. 551

Itonid. Youngomyia quercina Felt

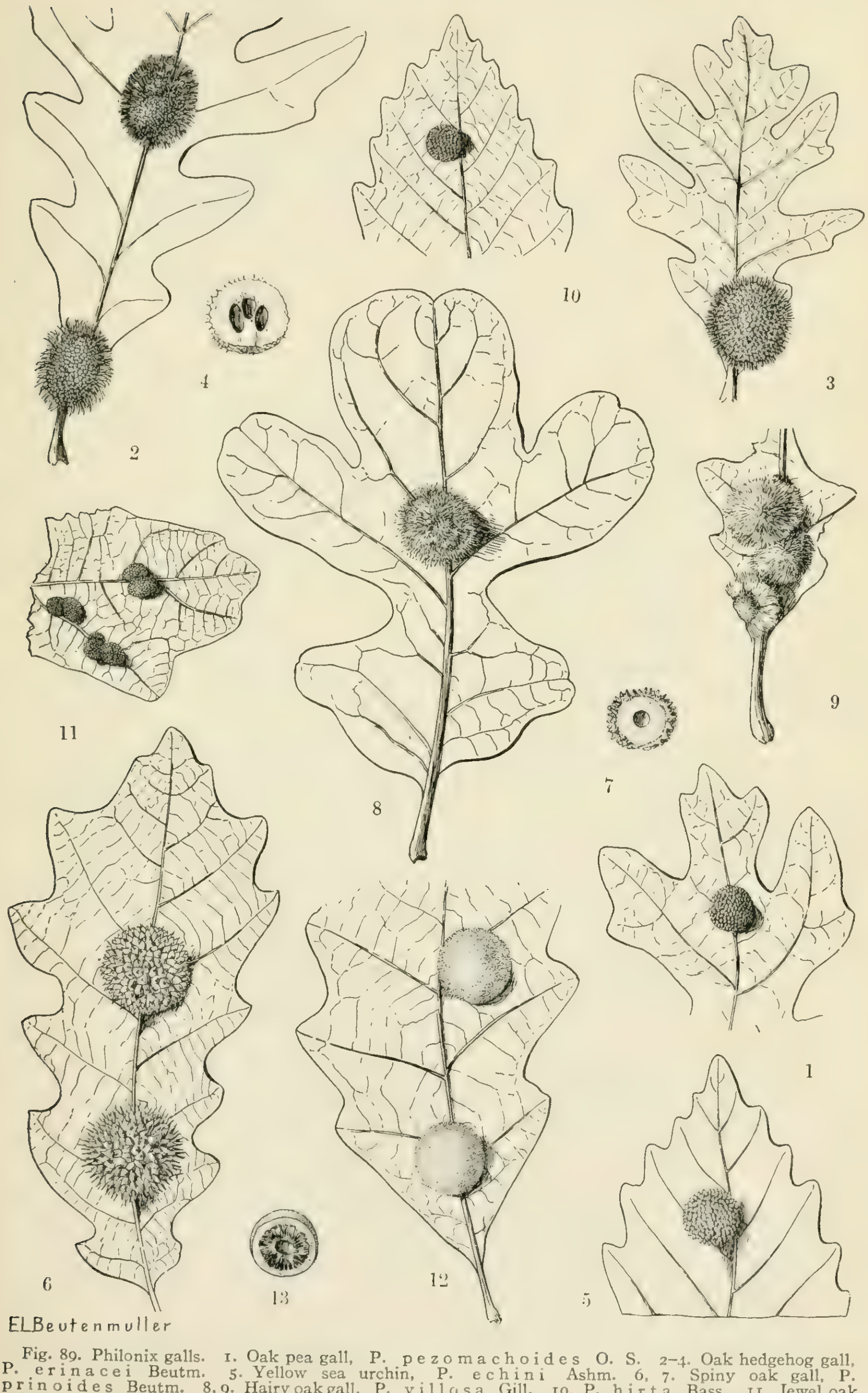

Fig. 89. Philonix galls. 1. Oak pea gall, P. pezomachoides O. S. 2–4. Oak hedgehog gall, P. erinacei Beutm. 5. Yellow sea urchin, P. echini Ashm. 6, 7. Spiny oak gall, P. prinoides Beutm. 8, 9. Hairy oak gall, P. villosa Gill. 10. P. hirta Bass. 11. Jewel oak gall, P. macrocarpae Bass. 12, 13. P. niger Gill. (After Beutm., Am. Mus. Nat. Hist.)

(7) Small, solid, fleshy galls loosely attached to the leaf

Subglobular, greenish yellow, smooth, hard leaf galls attached to the under surface, internally hard, fibrous, diameter 5 mm, vertical diameter 2 to 2.5 mm, on Q. laurifolia. Ashm. '81, p. XVIII

Cynipid. Andricus rugosus Ashm.

Globular, single or clustered leaf galls covered with minute, warty, pubescent dots, monothalamous, fleshy, on the upper surface, diameter 2.5 to 3.75 mm, on Q. minor. Fig. 84, 3, 4. Beutm. '09d, p. 245

Cynipid. Biorhiza mellea Ashm.

Globose, white or red tinged, waxlike, juicy, monothalamous gall on the under surface of leaves of Q. rubra and Q. coccinea. Beutm. '09d, p. 253

Cynipid. Philonix compressa Gill

(8) Moderate sized, hard galls loosely attached to the vein below and with a faceted or spiny surface

(*a*) Surface faceted

Globular, pale yellowish leaf galls finely netted with fissures or cracks and intervening elevated points; occurs on both surfaces and contains two larval cells, diameter 5 to 7 mm. Fig. 89, 1. Beutm. '09d, p. 247

Cynipid. Oak pea gall, Philonix pezomachoides O. S.

Oval or rounded, monothalamous, pale green or yellow leaf vein gall, the surface fissured, each facet with a short, hard point, diameter 2 to 4 mm, on Q. macrocarpa and Q. undulata. Fig. 89, 11. Beutm. '09d, p. 251

Cynipid. Jewel oak gall, Philonix macrocarpae Bass.

Globular, monothalamous, fissured, green gall, each facet with a short point, diameter 4 to 6 mm, on Q. prinus. Fig. 89, 10. Beutm. '09d, p. 350

Cynipid. Philonix hirta Bass.

(*b*) Facets on the surface pointed or spine-tipped

Globose leaf gall with the surface finely netted or fissured like a strawberry and covered with short, spiny prickles, yellowish, and containing one to four cells, diameter 5 to 7 mm, on Q. platanoides. Fig. 89, 5. Beutm. '09d, p. 248

Cynipid. Yellow sea urchin, Philonix echini Ashm.

Globular, woody, monothalamous midrib leaf gall with numerous conelike projections, green or yellowish, usually red tinged, diameter 6 to 12 mm, on Q. prinoides. Fig. 89, 6, 7. Beutm. '09d, p. 249

Cynipid. Spiny oak gall, Philonix prinoides Beutm

(*c*) Spines of the facets long

Globose or elongate, polythalamous leaf gall netted with fissures or cracks, more or less densely covered with spines and yellow, sometimes shaded with red, length 10 to 20 mm, diameter 6 to 12 mm, on Q. alba. Fig. 89, 2–4. Beutm. '09d, p. 247.

Cynipid. Oak hedgehog gall, Philonix erinacei Walsh[1]

(*d*) Spines long, hairlike

Globular, fissured midrib leaf gall somewhat like that of P. erinacei but densely covered with long, bristlelike hairs, pale yellow, monothalamous, bristlelike hairs 3 mm long, diameter 9 to 11 mm, on Q. macrocarpa. Fig. 89, 8, 9. Beutm. '09d, p. 249

Cynipid. Hairy oak gall, Philonix villosa Gill

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[1] Agamic form of Cynips erinacei, see Triggerson, Ent. Soc. Am. Ann. 7:26, 1914.

Subglobose, monothalamous, yellowish white, hairy vein gall, diameter 4 to 10 mm. Wash. Trotter '11, p. 106

Cynipid. Philonix sp.

(9) Solid galls attached to the leaf and with a central, harder kernel or larval cell. These approach the oak apple gall in structure

Globular, grayish, pubescent, monothalamous, thin-shelled leaf gall, pithy internally, diameter 7.5 to 8 mm, on the under surface, on Q. platanoides. Beutm. '09d, p. 252

Cynipid. Philonix lanaeglobuli Ashm.

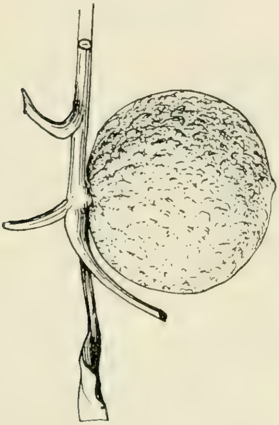

Fig. 90. Large oak apple, Amphibolips confluens Harr. (Original)

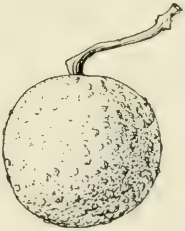

Fig. 91. Larger empty oak apple, Amphibolips inanis O. S. (Original)

Globular, below brownish, the size of a pea or slightly larger, two to ten on the under side of the leaf, within a dense, yellowish brown, spongy mass; diameter 3.75 to 6 mm, on Q. virens. Ashm. '81, p. X

Cynipid. Andricus virens Ashm.

(10) Oak apples, i. e. galls with a central, hard kernel or larval cell, a firm (often hard) outer shell and a spongy or fibrous intervening substance

(*a*) Intervening substance is spongy

[1] Size large

Globular, smooth, shining or opaque leaf gall, internally a juicy, white, spongy substance and a large central larval cell, green, turning with age to light brown, diameter 2.5 to 5 cm, usually on a vein or petiole, on Q. rubra, Q. coccinea and Q. velutina in May and June. Fig. 90, 92, 1-2. Beutm. '09b, p. 50

Cynipid. Large oak apple, Amphibolips confluens Harr.

Spherical oak apple, dirty yellow, with wine-red stripes, diameter 1 to 2 cm, resembles A. confluens. Mex. Trotter '11, p. 129

Cynipid. ? Amphibolips sp.

Globose, yellowish brown twig gall with an uneven, wrinkled surface, internally spongy, the larval cell rounded, diameter 3.5 to 7 cm, on Quercus sp. Fig. 111, 10, 11. Beutm. '09b, p. 64

Cynipid. Palmer's oak apple, Amphibolips palmeri Bass.

Fusiform, tapering, the apex usually somewhat curved, yellowish brown twig gall, internally spongy, with a hard larval cell, length 3 to 5.5 cm, diameter 1.5 to 3 cm, on Q. marilandica in May and June. Fig. 92, 4, 5. Beutm. '09b, p. 53

Cynipid. Fusiform oak apple, Amphibolips acuminata Ashm.

Globose, monothalamous, very thin-shelled leaf and twig gall, internally soft, light, spongy, not unlike A. confluens, form spongifica, diameters 3.5 and 3 cm. Beutm. '09b, p. 53

Cynipid. Amphibolips longicornis Bass.

Globular leaf gall resembling that of A. confluens, form spongifica, and A. cinerea, but the surface is more coarsely reticulated and less glossy and the larval cell much darker in color, diameter 2.5 cm, on midrib near base of leaf, on Q. ?minor. Fig. 92, 3. Beutm. '09b, p. 52

Cynipid. Amphibolips carolinensis Bass.

Lemon-shaped, monothalamous, green, yellowish and finally brown oak apple, length 10 to 15 mm, diameter 7 to 10 mm, the central cell with a length 4 to 4.5 mm, diameter 1.5 to 2 mm. Cal. Trotter '11, p. 114

Cynipid. Cynips sp.

Ellipsoidal, woody, greenish oak apple, the base rounded, apically a short, obtuse point, length 17 mm, diameter 10 mm. Cal.. Trotter '11, p. 110

Cynipid. Amphibolips sp.

Globular, grayish brown or black, pubescent, monothalamous, thin-shelled leaf gall, the larval cell supported by a loosely fibrous mass, diameter 6 to 11 mm, on under surface of leaf of Q. alba, Q. macrocarpa and Q. prinoides. Fig. 89, 12, 13. Beutm. '09d, p. 251

Cynipid. Philonix niger Gill.

[2] Size small

Globose, monothalamous, light reddish leaf gall filled with spongy tissue, except for the large cell, diameter 6 mm, on Q. rydbergiana. Beutm. '11d, p. 355

Cynipid. Dryophanta rydbergiana Ckll.

Globose, spined, brown, thick-shelled leaf gall, internally slightly spongy, diameter 7.5 mm, on Q. laurifolia. Beutm. '09b, p. 59

Cynipid. Spiny oak apple, Amphibolips spinosa Ashm.

Subspherical or subpyriform, monothalamous oak apple, diameter 4 to 5 cm. Mex. Trotter '11, p. 131

Cynipid. ?Cynips sp.

(*b*) The substance lying between the rind and the kernel is fibrous and often very scanty

[1] Size large, kernel central, leaf usually aborted

Globose, bright green, becoming yellowish brown, slightly nippled, thin-shelled, glossy leaf gall, the central larval cell supported by radiating fibers, diameter 25 to 35 mm, on Q. coccinea, Q. rubra in May and June. Fig. 91, 92, 6, 7. Beutm. '09b, p. 54

Cynipid. Larger empty oak apple, Amphibolips inanis O. S.

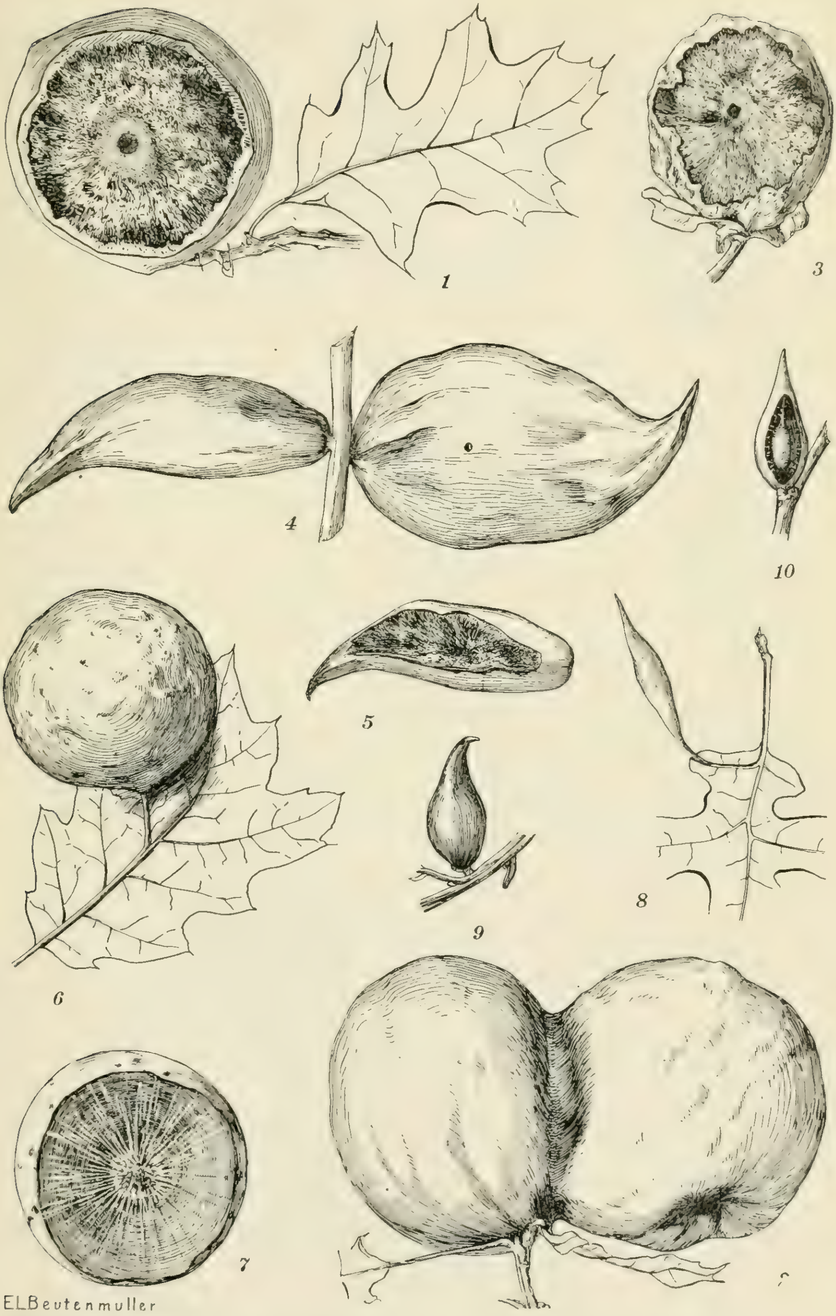

Fig. 92. Oak apples. 1, 2. Large oak apple, Amphibolips confluens Harr. 3. A. carolinensis Bass. 4, 5. Fusiform oak apple, A. acuminata Ashm. 6, 7. Larger empty oak apple, A. inanis O. S. 8–10. Oak spindle gall, A. coelebs O. S. (After Beutm., Am. Mus. Nat. Hist)

Globose, white, yellowish or brownish, velvety, thin-walled leaf gall, diameter 30 to 40 mm, within a thick-walled, fiber-supported cell with a diameter of 10 mm. Galls usually in groups of two or three, on the under side and near the base of the leaf. Kieff. '11, p. 346

Cynipid. Disholcaspis lapiei Kieff.

Globose, thin-shelled leaf gall with a central, filament-supported kernel, diameter 1.2 to 2.5 cm, resembles gall of A. inanis but averages smaller and the color is darker, on Q. vaccinifolia. Ashm. '97, p. 130

Cynipid. Callirhytis vacciniifoliae Ashm.

Globular, thin-shelled leaf gall, sometimes tinged with pink and covered with a white bloom; internally a central, filament-supported cell, diameter 15 to 20 mm, on under side of leaf of Q. minor. Fig. 63, 1. Beutm. '09a, p. 42

Cynipid. Dryophanta centricola O. S.

Globose or ovate, slightly nippled, dark crimson with lighter mottlings and becoming brown, thick-shelled twig gall with filament-supported larval cell, length 2.5 to 3.5 cm, diameter 2 to 3 cm, on Q. brevifolia. Fig. 93, 7–10. Beutm. '09b, p. 57

Cynipid. Amphibolips cinerea Ashm.

Subspherical, green, later yellowish, finally brown oak apple with numerous small points and a fiber-supported larval cell, diameter 3 cm. Cal. Trotter '11, p. 112

Cynipid. ? Callirhytis sp.

Globose, very thin-shelled, yellowish, irregularly reddish brown marked leaf gall containing a fiber-supported larval cell, diameter 2 cm, on Q. rubra. Fig. 99, 4, 5. Beutm. '11d, p. 351

Cynipid. Dryophanta rubrae Karsch

Globose or ovate, yellowish green or brown, glossy when dry, thin-shelled, slightly nippled, axillay bud gall, diameter 7 to 15 mm, on Q. nigra. Fig. 93, 1–4. Beutm. '09b, p. 57

Cynipid. Amphibolips melanocera Ashm.

Globose, thin-shelled, pubescent, yellowish, pink or red-shaded leaf gall, within a fiber-supported larval cell, diameter 6 to 18 mm, on Q. hypoleuca. Fig. 97, 6, 7. Beutm. '11d, p. 345

Cynipid. Dryophanta dugesi Mayr.

Irregular, subglobose, usually clustered, monothalamous, straw-colored or brown leaf gall containing a fiber-supported cell, occurs on both surfaces of the leaf, on Q. undulata and Q. gambelii. Fig. 68, 1, 2. Beutm. '11d, p. 348

Cynipid. Dryophanta eburnea Bass.

Fusiform to subglobular, pointed, yellowish, thin-shelled twig gall with a fiber-supported cell, length 12 to 24 mm, diameter 6 to 12 mm, on Q. phellos. Fig. 94, 6–10. Beutm. '09b, p. 56

Cynipid. Small pointed oak apple, Amphibolips citriformis Ashm.

Elongate, fusiform, dark green leaf gall, usually arising from the petiole, internally an ovate, fiber-supported cell, length 25 to 55 mm, diameter 7 to 20 mm, on the upper leaf surface of Q. nana. Fig. 93, 5, 6. Beutm. '09b, p. 55

Cynipid. Scrub oak gall, Amphibolips ilicifoliae Bass.

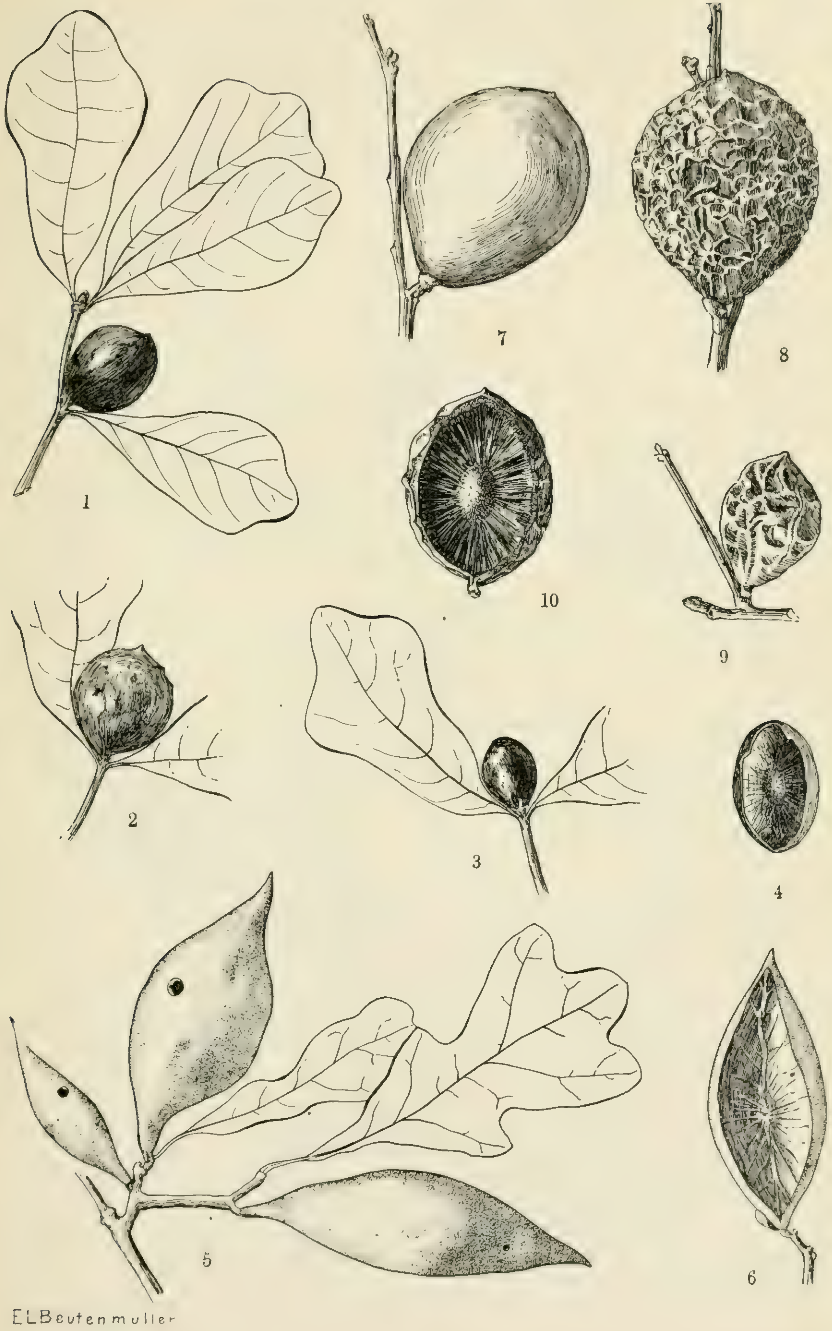

Fig. 93. Oak apples. 1–4. Amphibolips melanocera Ashm. 5, 6. Scrub oak gall, A. ilicifoliae Bass. 7–10. A. cinerea Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globose, single or clustered, yellowish, brown-spotted leaf galls occurring on both surfaces, a fiber-supported larval cell, diameter 15 to 35 mm, on Q. wrightii, Q. undulata and Q. garryana. Fig. 63, 2, 3. Beutm. '09a, p. 43

Cynipid. Cynips maculipennis Gill.

Spherical oak apple, smooth, reddish, with fiber-supported larval cell, diameter 15 to 20 mm. Cal. Trotter '11, p. 105

Cynipid. ? Cynips sp.

Globose, reddish brown oak apple containing a fiber-supported cell, maximum diameter 5 cm. Mex. Trotter '11, p. 128

Cynipid. ? Amphibolips sp.

[2] Size small, leaf aborted

Almond-shaped, pointed, keeled bud or twig gall, green or reddish, becoming brown, smooth, rather thick-shelled with a central, fiber-supported cell, length 12 to 20 mm, on Q. velutina and Q. rubra in autumn. Fig. 88, 1, 2. Beutm. '09b, p. 59

Cynipid. Keeled oak apple, Amphibolips tinctoriae Ashm.

Globose, slightly nippled, green, spotted with red, becoming brown, moderately thick-shelled twig or bud gall, with a fiber-supported, central cell, diameter 16 to 18 mm, on Q. rubra in September and October. Fig. 94, 1–5. Beutm. '09b, p. 58

Cynipid. Amphibolips cookii Gill

Globular, very thin-shelled leaf gall containing a fiber-supported cell, diameter 8 mm, on Q. laurifolia. Ashm. '87, p. 141

Cynipid. Andricus femoratus Ashm.

[3] Gall small, leaf present and gall usually on the under side and solitary

Globose, yellowish, yellowish brown and brown spotted when dry, leaf gall, single or clustered, with fiber-supported cell, diameter 15 to 35 mm, on under surface of leaf of Q. wrightii, Q. undulata and Q. garryana. Beutm. '09a, p. 43

Cynipid. Cynips maculipennis Gill.

Globular, thin-shelled, straw colored, stained with rusty brown and a fiber-supported central cell, diameter 11 to 18 mm, on Q. undulata. Fig. 63, 4, 5. Beutm. '09a, p. 42

Cynipid. Disholcaspis brevipennata Gill.

Globose, monothalamous, thin-shelled leaf gall, often near the margin and mostly on the midrib, with a fiber-supported cell, brown or pinkish brown when dry, with a fine pubescence and nearly smooth though not polished, diameter 12 to 22 mm, on Q. ? arizonica. Fig. 97, 1–3. Beutm. '11d, p. 343

Cynipid. Dryophanta bella Bass.

Subglobose, monothalamous, brown, thin-shelled, solitary or clustered leaf gall, diameter 2 to 3.5 mm, on under surface of leaf of Q. emoryi. Fig. 108, 4–7. Beutm. '11d, p. 356

Cynipid. Dryophanta emoryi Ashm.

Globular, smooth, green leaf gall, diameter 6 to 12 mm, on red oak. Fig. 95, 96. Bassett '63, p. 326

Cynipid. Small oak apple, Andricus singularis Bas

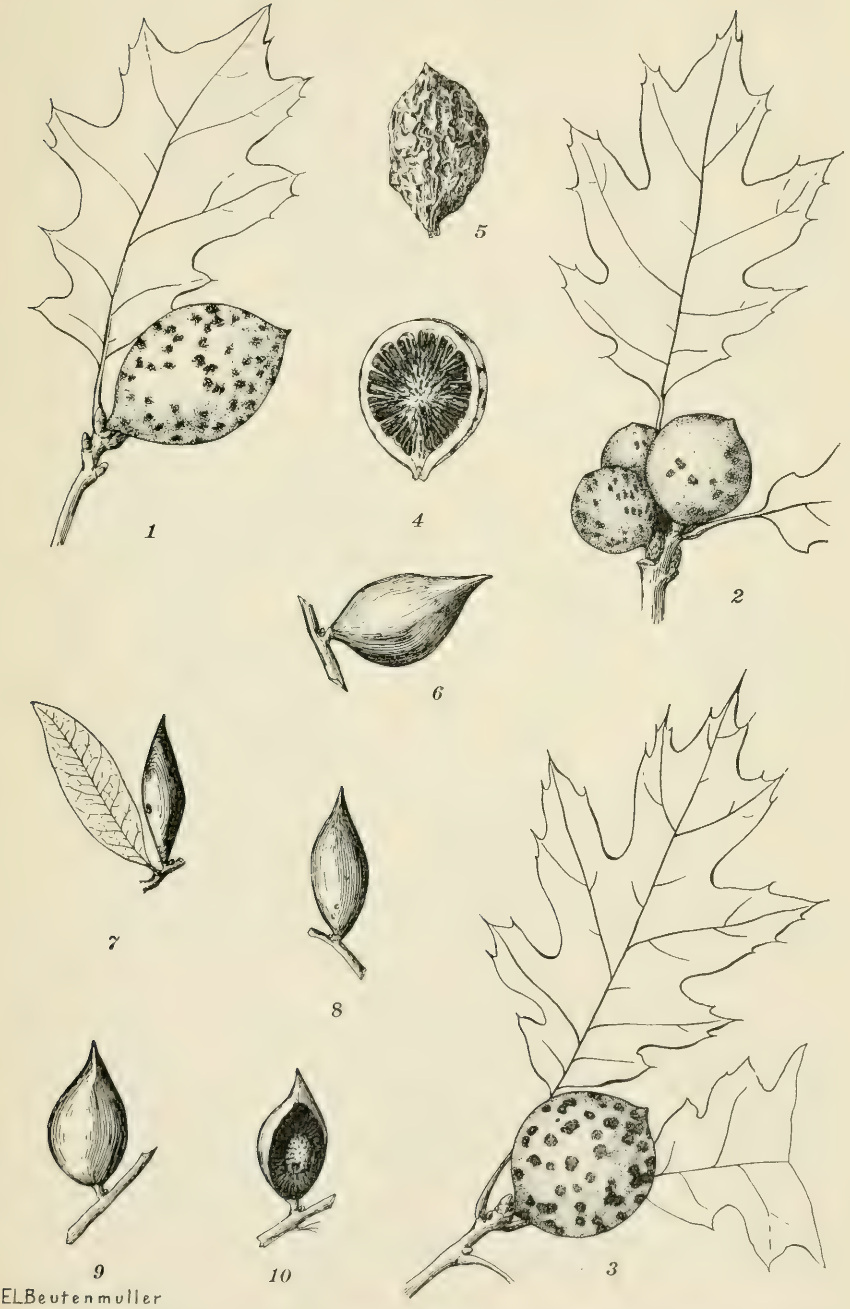

Fig. 94. Oak apples. 1–5. Amphibolips cookii Gill. 6–10. Small pointed oak apple, A. citriformis Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globular, minutely pubescent, reddish, greenish or brownish leaf gall, diameter 4–7 mm, on Q. grisea. Fig. 98.

Cynipid. Cynips sp. a2062

Globose, somewhat oblong, hollow, pale greenish yellow leaf gall with a fiber-supported cell, on Q. ilicifolia and Q. coccinea. Pl. 1, fig. 5. Bassett '63, p. 327

Cynipid. Andricus ostensackenii Bass.

(11) Galls small, the leaf present and the galls tend to cluster

(*a*) Cells central in the gall

Globose, monothalamous, yellow, thin-shelled leaf gall, tinged with red or brown, diameter 10 to 15 mm, the central cell fiber-supported on both surfaces of leaf of Q. minor. Fig. 99, 1–3. Beutm. '11d, p. 349

Cynipid. Polished oak gall, Dryophanta polita Bass.

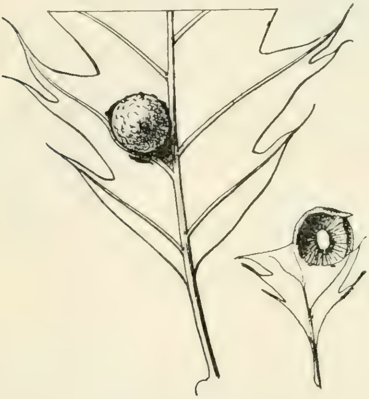

Fig. 95. Small oak apple, Andricus singularis Bass. Gall on leaf and one in section. (Original)

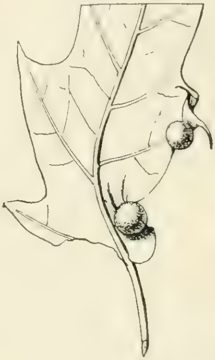

Fig. 96. Small oak apple, Andricus singularis Bass. A small gall provisionally referred to this species. (Original)

Globose, brown, subopaque leaf galls with a central, fiber-supported cell, diameter 6 to 8 mm, on Quercus sp. Ashm. '97b, p. 68

Cynipid. Trichoteras coquilletti Ashm.

(*b*) Cell basal, against the leaf

Subglobose, flattened basally, leaf galls usually on the midrib, the shell thick, the interior filled with silvery-white hairs supporting a larval cell attached to the base of the gall, on both surfaces of leaf of Q. undulata, Q. gambellii. Fig. 68, 1, 2. Beutm. '11d, p. 348

Cynipid. Dryophanta eburnea Bass.

Gall similar to that of D. eburnea but shining, brownish above and probably on a different species of oak. Beutm. '11d, p. 348

Cynipid. Dryophanta simillima D. T.

Spherical, subcoriaceous, reddish, monothalamous vein gall, developing in fissures of crossveins. Wash. Trotter '11, p. 108

Cynipid. Dryophanta sp.

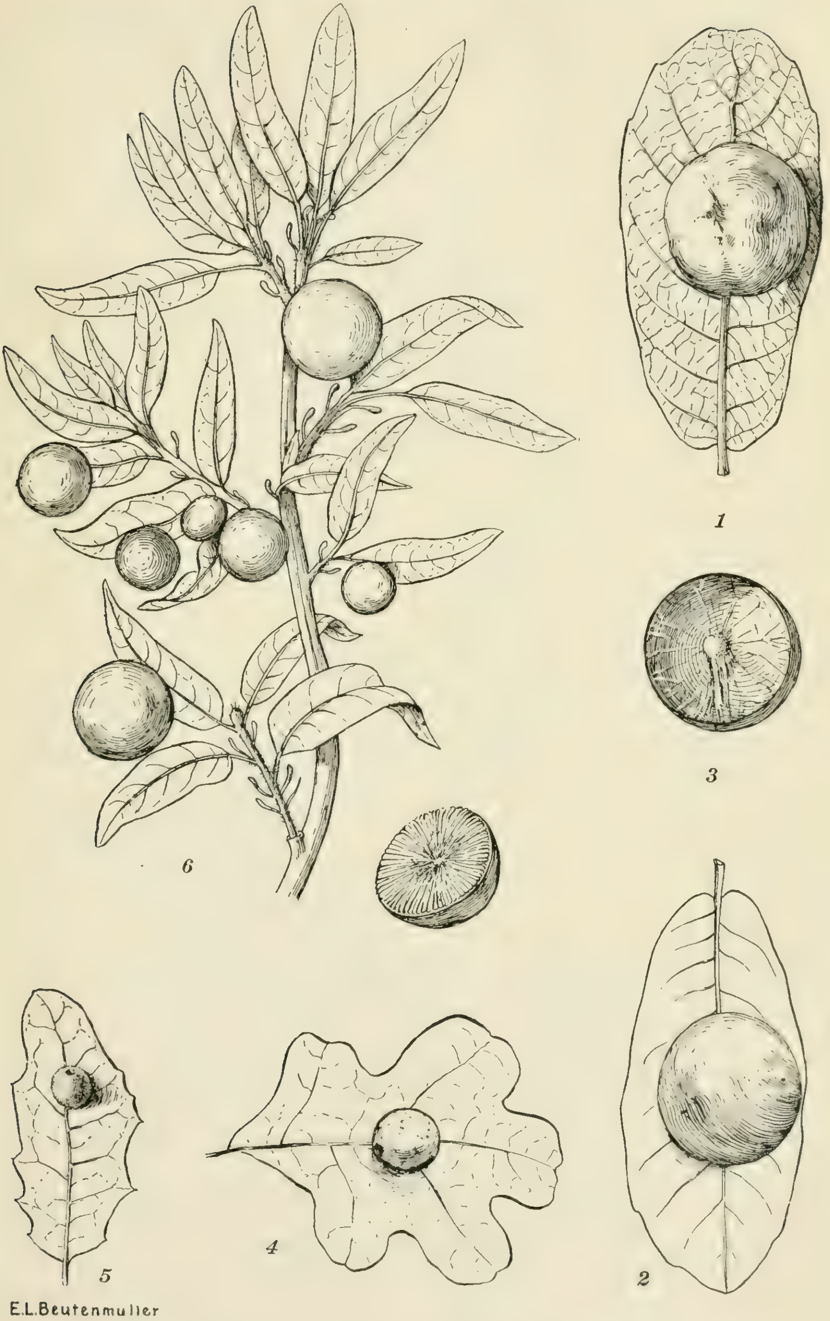

Fig. 97. Dryophanta galls. 1–3. D. bella Bass. 4. D. carolina Ashm. 5. D. multipunctata Beutm. 6, 7. D. dugesi Mayr. (After Beutm., Am. Mus. Nat. Hist.)

Ovate, small, monothalamous apical vein gall developing in a slit, woody, the walls thin, smooth, shining and reddish. Cal. Trotter '11, p. 113

Cynipid. Cynips sp.

(12) Small, thin-walled, globose or fusiform galls, usually marginal, on the leaf and piercing the lamina

Globose, densely pruinose, thin-walled leaf or ament gall, diameter 3 to 3.75 mm, sometimes banded by a minute ridge, on Q. obtusiloba. Bassett '00, p. 311

Cynipid. Andricus pruinosus Bass.

Oval, thin-walled, monothalamous vein swelling covered with a dense, brown pubescence, on Q. alba. Fig. 53, 10. Beutm. '10c, p. 128

Cynipid. Neuroterus pallipes Bass.

Hemispherical or subhemispherical, pale brown, minutely crackled vein gall, diameter 4 mm, height 2.5 mm, on Quercus sp. Fig. 107, 10. Beutm. '10c, p. 125

Cynipid. Neuroterus cockerelli Beutm.

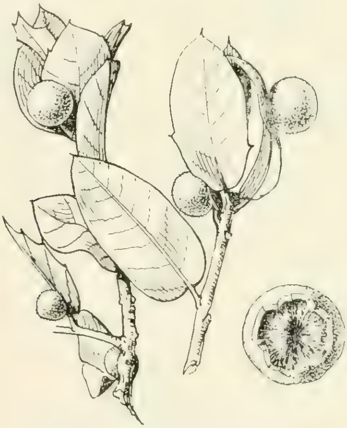

Fig. 98. Cynips sp. on Q. grisea. One shown in section. (Original)

Small, round, thin-shelled galls on leaf blades, usually near the margin and always on the upper leaf veins, projecting on both surfaces, diameter 3.7 mm, on Q. undulata. Bassett '90, p. 77

Cynipid. Andricus pilula Bass.

Hemispherical, pale brown, reticulate leaf gall with minute, reddish tubercles, diameter 3 mm, on Q. undulata. Fig. 108, 8. Beutm. '11d, p. 357

Cynipid. Dryophanta pulchripennis Ashm.

Brown, globose, pedunculate, midrib leaf gall, diameter 3 mm, on Q. rubra. Pl. 2, fig. 1. Ashm. '97, p. 121

Cynipid. Andricus rileyi Ashm.

Ovate, monothalamous, grayish, pubescent vein gall with a very thin wall and joined by a short stem to the side of the vein, length 2.5 mm, diameter 2 mm. Mex. Trotter '11, p. 130

Cynipid. ?Neuroterus ostreatus Trott.

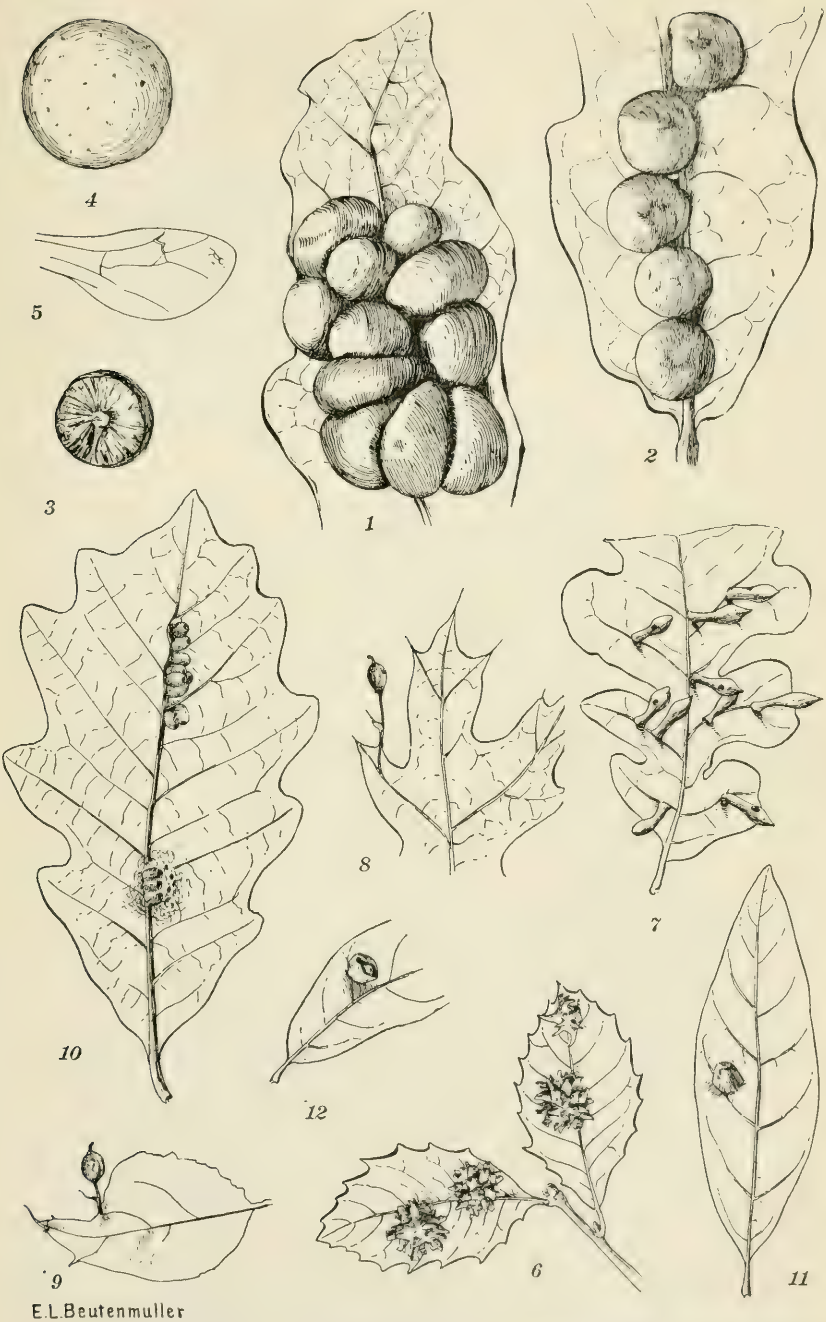

Fig. 99. Dryophanta galls. 1–3. Polished oak gall, D. polita Bass. 4, 5. D. rubrae Karsch. 6. Red sea urchin, D. echina O. S. 7. Clubbed oak leaf gall, D. clavula Beutm. 8, 9. D. pedunculata Bass. 10. D. ignota Bass. 11–12. D. cinereae Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globose, thin-shelled leaf gall with a slight point apically, diameter .75 mm to 1 mm, on Q. undulata, Q. alba, Q. minor and Q. macrocarpa. Fig. 107, 9, 12. Beutm. '10c, p. 125

Cynipid. Jumping bullet gall, Neuroterus saltatorius Hy. Edw.

Globular, green or purplish, pubescent, monothalamous leaf and petiole gall, diameter 3.75 mm, on Q. alba. Bassett '81, p. 78

Cynipid. Andricus utriculus Bass.

(13) Small galls attached to the leaf blades, of various structure and peculiar form

Globose, monothalamous leaf galls with many pointed processes not much shorter than the diameter of the gall, color red or pinkish, covered with a crystalline substance, diameter 5 to 8 mm, on both surfaces of leaf of Q. agrifolia. Fig. 99, 6. Beutm. '11d, p. 351

Cynipid. Red sea urchin gall, Dryophanta echina O. S.

Subconical or convex, the apex subtruncate or almost umbilicate, smooth, brown, reddish, minutely pubescent leaf gall, diameter 4 to 5 mm, height 2.5 to 3.5 mm. Mex. Trotter '11, p. 125

Cynipid. ?Neuroterus sublenticularis Trott.

Cylindrical, fimbriate, bright red and yellow banded leaf gall on live oak, height 4 to 6 mm, diameter 2 to 3 mm, the distal portion hollow, the outer surface with numerous long, yellowish or reddish processes, solitary, Arizona (See A. tubicola, p. 109)

Cynipid. Andricus splendens Weld,[1] MS.

Stellate, reddish brown midvein gall with four subconical, radiating arms, the extreme diameter 5 mm. Mex. Trotter '11, p. 123

Cynipid. ?Cynips sp.

Squash-shaped or top-shaped leaf gall, the marginal ridge produced in 7 to 10 irregular tubercles, brown, with a lilac gray bloom, diameter 6 to 10 mm, height 7 to 10 mm, on Q. douglasii. Fig. 64, 10, 11. Beutm. '09a, p. 37

Cynipid. Spined turban gall, Disholcaspis douglasii Ashm.

Small, wartlike midrib galls on the under surface of the leaves and with corollalike processes apically, on Q. alba. Gill. '89, p. 214

Cynipid. Flowery oak gall, Andricus foliaformis Gill.

Small, irregularly cubical leaf gall with many ridges and pointed projections, length 8 mm, diameter 5 mm, on Q. lobata. Fullaway '11, p. 345

Cynipid. Cynips heldae Fullw.

Hemispherical leaf gall covered with a white, crystallike pubescence, diameter 1.5 to 2.25 mm, on Q. minor. Fig. 107, 5. Beutm. '10c, p. 122

Cynipid. Neuroterus verrucarum O. S.

Spindle-shaped or clavate leaf galls on under surface, length 5 to 7 mm, diameter of narrow part 1 mm, of inflated portion 1.75 mm, on Q. lobata. Fig. 99, 7. Beutm. '11b, p. 67

Cynipid. Clubbed oak leaf gall, Dryophanta clavula Beutm.

Fusiform, green, succulent, thin-shelled leaf gall with a free cell within, occurs singly on the acute lobes of several oaks. Fig. 68, 4. Beutm. '11d, p. 366

Cynipid. Dryophanta notha O. S.

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[1] See also, (14) (*b*) on p. 109.

Ovate-acuminate, blisterlike galls on the points of the acute lobes of the leaf, each with a long, hairlike point, on Q. coccinea. Bassett '90, p. 74
Cynipid. Leaf-lobe blister gall, Callirhytis pusulatoides Bass.

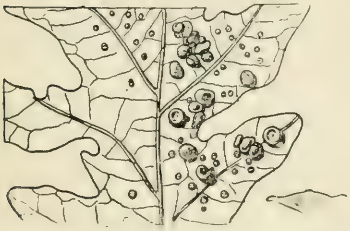

Fig. 100. Oak button gall, Neuroterus umbilicatus Bass. One gall shown in section. (Original)

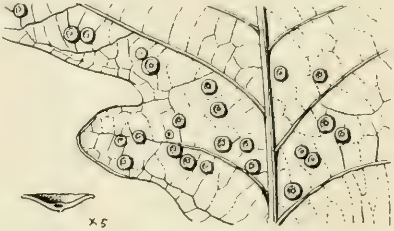

Fig. 101. Oak spangles, Cecidomyia poculum O. S., on Q. alba. One gall shown in section. (Original)

Ellipsoidal, very small, monothalamous, yellowish, minutely pubescent leaf gall occurring on either surface, diameter 1 mm, on opposite side of leaf a yellowish spot with a diameter of 1 to 2 mm. Cal. Trotter '11, p. 119
Cynipid. ? Neuroterus perpusillus Trott.

Rounded, flattened, disklike, monothalamous leaf galls, pinkish or purplish apically, sometimes yellowish, diameter 3 to 4 mm, height 1 mm, on white oak. Fullaway '11, p. 334
Cynipid. Biorhiza californica Beutm.

Small, circular, flattened, brown, monothalamous leaf galls, concave and with a minute, conical elevation centrally, diameter 1 to 1.5 mm, in greatest numbers on the under surface of the leaf, on Q. platanoides. Fig. 85, 7, 100. Beutm. '10c, p. 124
Cynipid. Oak button gall, Neuroterus umbilicatus Bass.

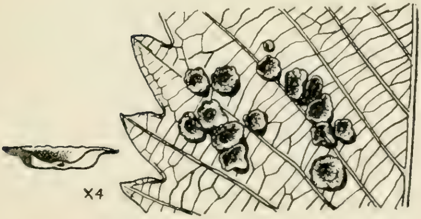

Fig. 102. Oak spangles, Cecidomyia poculum O. S., on Q. muhlenbergiae. One gall shown in section. (Original)

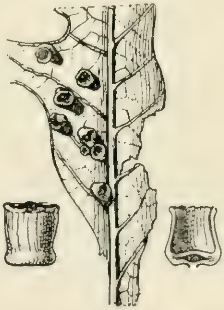

Fig. 103. Oak spangles, Cecidomyia poculum O. S., on Q. macrocarpa. Side view and section of gall. (Original)

Disk-shaped, often flat, greenish leaf galls with a lilac center, the margin irregular, diameter 6 mm, on Q. douglasii. Fullaway '11, p. 352
Cynipid. Andricus pattersonae Fullw

Disk-shaped, flat, hard, smooth, monothalamous galls on the under side of the leaves, diameter 5 to 6 mm, on Q. chrysolepis. Fullaway '11, p. 363

Cynipid. Callirhytis guadaloupensis Fullw.

Button-shaped vein gall with a depressed center and median larval cell having the smoothness and polish of bone, the diameter 10 to 13 mm, height 6.7 mm. Cal. Trotter '11, p. 106

Cynipid. Andricus patelloides Trott.

Saucerlike, small galls frequently on the under side of the leaves, usually clustered and varicolored, diameter 3–5 mm, on Q. alba, Q. macrocarpa, Q. obtusiloba. Pl. 8, fig. 1, 2, fig. 101, 102, 103. Stebb. '10, p. 27

Itonid. Oak spangles, Cecidomyia poculum O. S.

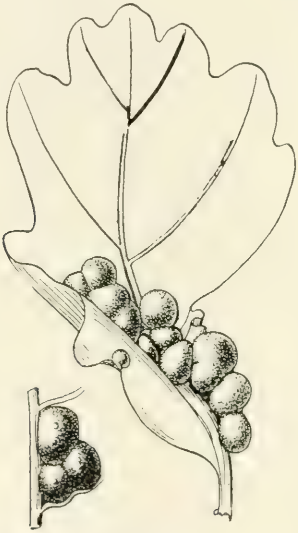

Fig. 104. Gall of Neuroterus majalis Bass. (Original)

Saucer-shaped, sessile, minute, flat, red leaf galls on the under surface, diameter 3 mm, on Q. lobata. Bassett '00, p. 312

Cynipid. Andricus parmula Bass.

Very irregular, flat, green, succulent leaf galls, brown when dry, diameter 6 to 25 mm, height 6 to 9 mm, on Q. alba and Q. prinus. Fig. 85, 4–6, 104. Beutm. '10c, p. 134

Cynipid. Neuroterus majalis Bass.

Flattened, rounded, disklike, monothalamous oak leaf galls, pinkish or purplish, sometimes with a yellowish apex, the sides flat and very thin, diameter 3 to 4 mm, on white oak. Beutm. '11b, p. 69

Cynipid. Philonix californica Beutm.

Broad, ovate, saucer-shaped leaf gall terminating in a slender cone with incurved sides, pubescent, smoky gray, length 6 mm, diameter 5 mm, on Q. douglasii. Bassett '00, p. 316

Cynipid. Andricus kingi Bass.

Saucerlike, flattened, clustered, monothalamous galls with a minute central point, the edge slightly raised, closely resembles gall of Cecidomyia poculum, diameter 1.5 to 2 mm, height .75 mm, on Q. undulata. Fig. 68, 13. Beutm. '11d, p. 368

Cynipid. Dryophanta discus Bass.

Fusiform, marginal, smooth, solitary fold, length 6 mm, diameter 2 mm, the walls somewhat thickened, on live oak. Fig. 105

Cal. Cynipid. Dryophanta sp. a2570

Ovate, pocket-shaped, marginal, pilose leaf fold, usually clustered, sometimes single, length 4 mm, diameter 3 mm, on live oak. Fig. 106

Cal. Cynipid. Dryophanta sp.

Ovate, pocket-shaped, marginal leaf fold with greatly thickened walls, solitary, sometimes in pairs, length 5 to 8 mm. Cal. Trotter '11, p. 108

Itonid. ? Diplosis silvestrii Trott.

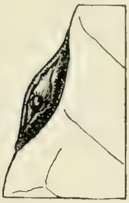

Fig. 105. Dryophanta sp., a2570, enlarged. (Original)

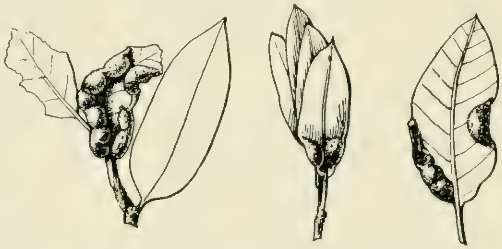

Fig. 106. Dryophanta sp. on live oak. Cal. (Original)

Gall a folded leaf edge between serrations. Pl. 8, fig. 5. Ent. News 19:349

Itonid. Marginal fold gall, Itonida foliora Rssl. & Hkr.

Galls similar, possibly identical. Felt. '06b, p. 672

Itonid. Cecidomyia erubescens O. S.

(14) Galls composed apparently of crystalline matter; attached to the leaves

(*a*) Solitary, globular

Globose, pink, thick-walled leaf galls on the under surface, with 50 or 60 short, blunt horns, diameter 9 to 18 mm, on Quercus sp. Bassett '90, p. 81

Cynipid. Handsome oak gall, Andricus speciosus Bass.

Clustered, woolly, bright pinkish leaf galls, the wool crystalline, semitransparent, diameter 3 to 8 mm, on Q. ? agrifolia, Q. dumosa, Q. douglasii. Bassett '00, p. 319

Cynipid. Andricus crystallinus Bass.

(*b*) Clustered, tubular

Tubular leaf gall, length 7 to 10 mm, narrow basally, open apically, yellowish, the surface with numerous red spines, the interior divided by two horizontal partitions, the basal and distal cavities empty, the latter open, on Q. obtusiloba. Osten Sacken '61, p. 60

Cynipid. Spined oak tube gall, Andricus tubicola O. S.[1]

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[1] See also, A. splendens on p. 106

Tubular, monothalamous, yellowish red vein gall, truncate and deeply excavated apically, the walls of the cavity contracted near the top, larval cell just beneath and an empty cavity below, height 7 mm, diameter 5 mm. Wash. Trotter '11, p. 107

Cynipid. ? Trigonaspis vaccinioides Trott

(15) Small, fleshy galls, clustered on leaves

(*a*) Split midvein in their growth

Clusters of seedlike bodies, often 30 to 40 together, occur on the under side of the midvein of red oak leaves, the larger cells smooth, greenish white with an enlarged apex and about the size of grains of wheat, on Q. bicolor, Q. ilicifolia, Q. rubra and Q. coccinea. Pl. 3, fig. 1. Bassett '64, p. 689

Cynipid. Oak leaf seed gall, Cynips decidua Bass.

Clustered, pubescent, globular, drab or brownish red midvein galls, frequently splitting and extending along the vein 4 to 8 cm, diameter 3 to 9 mm, occur in clusters of 10 to 100 or more on a leaf, on Q. rubra. Pl. 1, fig. 6. Bassett '00, p. 314

Cynipid. Andricus piperoides Bass.

Pyriform, usually clustered, reddish brown leaf gall with a minute, whitish pubescence and arising from a slit in the basal two-thirds of the midvein, height 5 to 8 mm. Cal. Trotter '11, p. 117

Cynipid. ? Andricus sp.

(*b*) Do not split midvein in growing

Galls in rounded masses, a few to 30 in each, closely packed, clustered on the under side of the midrib or petiole, monothalamous, globose, pointed basally, greenish, tinged with pink when fresh, grayish when old, individual galls, diameter 2.5 mm to 3 mm, diameter of masses from 6 to 15 mm, on burr oak, dwarf chestnut oak and white oak. Beutm. '13e, p. 245

Cynipid. Cynips dimorphus Gill.

Clustered, bell-shaped, monothalamous, greenish or reddish leaf vein gall, shaped somewhat like a huckleberry blossom, length 3 to 4 mm, on Q. minor. Fig. 84, 6. Beutm. '09, p. 255

Cynipid. Bell-shaped oak gall, Zopheroteras vaccinii Ashm.

Conical, clustered leaf gall attached to the under surface of the midrib, on Q. bicolor. Gill. '89, p. 217

Cynipid. Cynips nigricens Gill.

(16) Galls attached to leaves and covered with woolly fibers

(*a*) Small cells, each with a separate crown of wool

Globose leaf gall, densely covered with coarse, brown, mosslike wool, diamete 1.25 to 2.50 mm, on under side of leaf, on Q. virginiana. Fig. 107, 4. Beutm. '10c, p. 123

Cynipid. Neuroterus minutissimus Ashm.

Globose leaf gall, smooth above, thickly covered with white wool below, single or confluent, diameter 1.5 to 3.5 mm, on Q. alba, Q. platanoides. Fig. 107, 1-3. Beutm. '10c, p. 123

Cynipid. Oak flake gall, Neuroterus floccosus Bass.

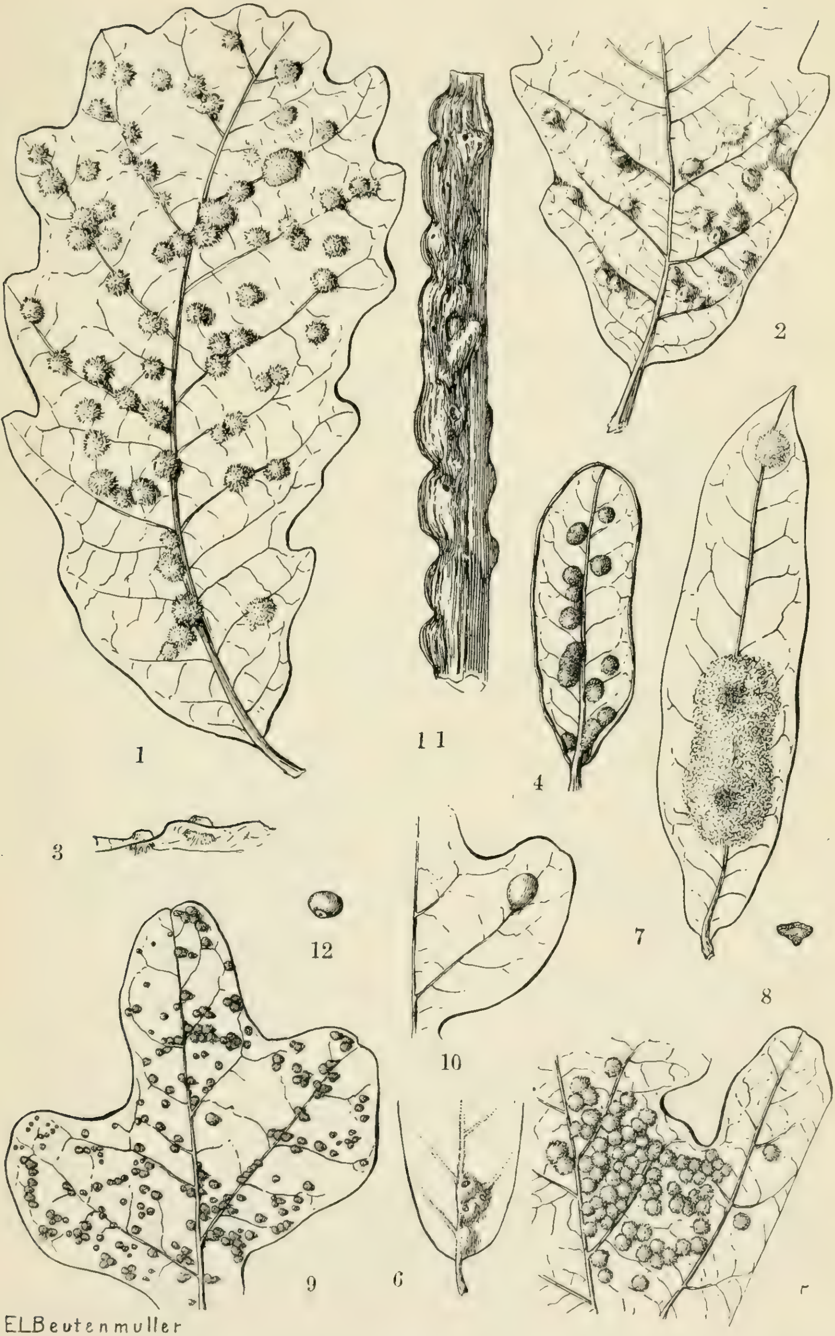

Fig. 107. Neuroterus galls. 1–3. Oak flake gall, N. floccosus Bass., upper, lower and side view. 4. Gall of N. minutissimus Ashm. 5. Gall of N. verrucarum O. S. 6. Gall of N. howertoni Bass. 7, 8. Gall of N. laurifoliae Ashm. 9, 12. Jumping bullet gall, N. saltatorius Hy. Edw. 10. Gall of N. cockerelli Beutm. 11. Gall of N. rileyi Bass. (After Beutm., Am. Mus. Nat. Hist.)

Light brown, budlike, thin-shelled, marginal leaf gall covered with short wool, length 2 to 3 mm, on Q. alba. Fig. 53, 12, 13. Beutm. '10c, p. 132

Cynipid. Neuroterus clarkeae Beutm.

Globose, brown-haired, clustered vein galls, each monothalamous, diameter 2.5 mm on upper surface, usually two or three in a cluster and not showing on the lower surface.

Cynipid. Neuroterus sp. a2762

(*b*) Small, seedlike cells in groups and covered by wool

Woolly, whitish, mass on the under side of the leaves, usually along the midrib, diameter 9 mm, containing a mass of small, monothalamous cells, on Q. alba, Q. macrocarpa, Q. lobata. Pl. 1, fig. 2. Walsh '64, p. 482

Cynipid. Andricus flocci Walsh

Globose leaf gall, smooth above, thickly covered with white wool beneath, singly or confluent, diameter 1.5 to 3.5 mm, on Q. alba, Q. platanoides. Fig. 107, 1-3. Beutm. '10c, p. 123

Cynipid. Oak flake gall, Neuroterus floccosus Bass.

Small, flattened, circular or irregular tufts of rather long, whitish or reddish wool covering two to six irregular, brown, seedlike kernels, usually on the under surface, diameter 1.8 to 2 mm. Ashm. '81, p. XIII

Cynipid. Andricus lanigera Ashm.

Clustered, larval cells along the midvein, the cells hidden in short, dense, brownish wool, the largest clusters often more than half the length of the leaf, on Q. obtusiloba. Bassett '81, p. 98

Cynipid. Andricus pattoni Bass.

Oval, rather thick-shelled, brown leaf vein gall, at first woolly, later naked, length 3 mm, diameter 1.5 mm, on Q. platanoides. Fig. 99, 10. Beutm. '11d, p. 359

Cynipid. Dryophanta ignota Bass.

White or buff-colored, woolly masses attached to the principal veins on the under side of the leaves, on Q. alba. Pl. 1, fig. 4. Felt '06b, p. 625

Cynipid. Oak wool gall, Andricus lana Fitch

Monothalamous, clustered, hard, woody, subcylindrical, wedge-shaped or subtriangular leaf galls, each densely covered with short, coarse, whitish woolly fibers, the cluster appearing as one large gall, on Q. minor. Beutm. '09f, p. 248

Cynipid. Andricus texanus Beutm.

Subdiscoidal leaf gall, diameter 3.5 to 5 mm and with whitish gray, transparent, radiating hairs; on the opposite surface a discolored depression with a diameter of 1 mm. Mex. Trotter '11, p. 130

Cynipid. Neuroterus bonanseae Trott.

Button-shaped, golden-yellow haired, vein gall, diameter 10 to 20 mm and consisting of a number of cells, each with a diameter of 3.5 mm and sometimes of 10 mm. Mex. Trotter '11, p. 124

Cynipid. Philonix comata Trott.

(*c*) Cells large, not seedlike but clustered under wool as before

Globose, kernel-like leaf galls occurring singly or in clusters and covered with long, loose, fawn-colored wool, diameter of kernel 2 to 2.5 mm, on Q. laurifolia, Q. imbricaria. Fig. 107, 7, 8. Beutm. '10c, p. 130

Cynipid. Neuroterus laurifoliae Ashm

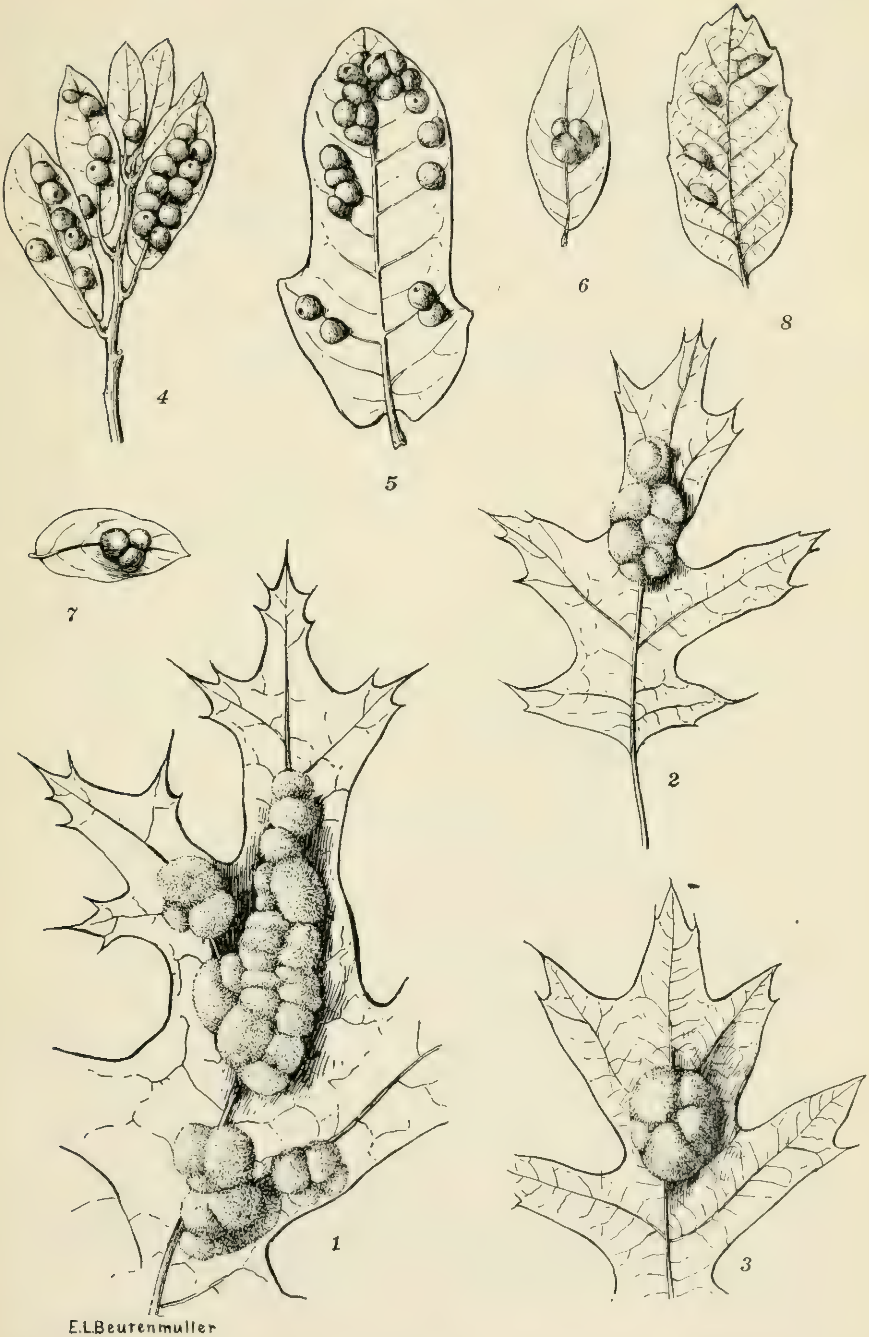

Fig. 108. Dryophanta galls. 1–3. D. lanata Gill. 4–7. D. emoryi Ashm. 8. D. pulchripennis Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Globular, fleshy, monothalamous leaf gall with dense, yellow wool, diameter 5 to 6 mm, on upper surface, on Q. catesbaei Ashm. '87, p. 144

Cynipid. Andricus infuscatus Ashm.

Bunches of pale brown wool on under surface of leaf, each with 2 to 8 triangular or irregularly conical cells, diameter 5 to 15 mm, on Q. rubra, Q. coccinea, Q. velutina, Q. marylandica, Q. phellos, Q. nana. Fig. 108, 1-3. Beutm. '11d, p. 350

Cynipid. Dryophanta lanata Gill.

Globular or hemispherical, densely haired, pinkish red clusters of leaf galls, each with 1 to 5 larval cells, diameter 5 to 12 mm, on Q. ?arizonica. Fig. 68, 3. Beutm. '11d, p. 344

Cynipid. Dryophanta nubila Bass.

Monothalamous, clustered, thin-shelled, reddish, woolly oak leaf gall, individual galls, diameter 1 to 1.5 mm, height 2 mm, on Q. lobata. Beutm. '13c, p. 244

Cynipid. Andricus fullawayi Beutm.

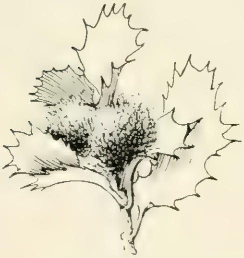

Fig. 109. ?Callirhytis flocculenta Trott. on live oak. (Original)

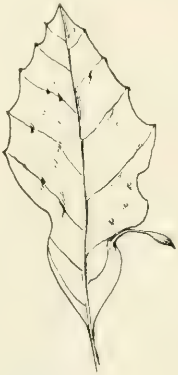

Fig. 110. Oak capsule gall, Andricus capsulus Bass. (Original)

Globose, grayish brown, clustered leaf gall, sometimes slightly flattened basally, irregularly wrinkled and covered with dense, short, woolly hairs, diameter 8 mm, on Q. lobata. Fig. 97, 5. Beutm. '11b, p. 67

Cynipid. Dryophanta multipunctata Beutm.

Subelliptical or subcylindrical, yellowish vein gall with long, yellowish hairs and ordinarily in clusters of two to three, length about 3 mm, differs from A. infuscatus by the greater thickness of the walls. Cal. Trotter '11, p. 116

Cynipid. Andricus sp.

Depressed, hemispherical, grayish red vein gall, the mass with a diameter of 5 to 15 mm, individual galls, subpyramidal, the surface rough and with clusters of minute, whitish hairs, major diameter 5 to 6 mm, diameter of base 4 to 5 mm. Cal. Trotter '11, p. 119

Cynipid. ?Cynips sp.

(*d*) Cells small and bonded together by a hard substance

Hemispherical, hard, polythalamous leaf gall covered with pale yellowish wool, more or less ringed with ferruginous, stem entirely rust-red, resembles A. floccus, diameter 5 to 9 mm, occurs on both surfaces of Q. chrysolepis. Ashm. '97, p. 132

Cynipid. Callirhytis lasius Ashm.

Densely haired, russet-colored, hemispherical masses attached by a small point to the upper surface of the leaf, diameter 12 to 18 mm, on Quercus sp. Bassett '81, p. 92

Cynipid. Bassettia tenuicornis Bass.

(*e*) Polythalamous, under wool

Woolly, rusty, yellowish brown, polythalamous midvein gall, dimensions 2 by 3 cm on Q. ? crassifolia. Bassett '90, p. 78

Cynipid. Andricus mexicanus Bass.

(*f*) Monothalamous, large

Irregular, lemon-shaped, monothalamous oak apple, length 8 to 10 mm, diameter 5 to 7 mm, thickly covered with whitish, fulvous hairs. Fig. 109. Cal. Trotter '11, p. 115

Cynipid. ? Callirhytis flocculenta Trott.

(17) Galls on pedicels attached to the leaves

Elongate or fusiform, pointed leaf or twig gall, usually with a long pedicel, the prolongation of a leaf vein, pale green, thin-shelled and with an oblong, thin larval cell supported by radiating fibers, length 20 to 25 mm, diameter 4 to 8 mm, on Q. coccinea and Q. rubra. Fig. 92, 8-10. Beutm. '09b, p. 56

Cynipid. Oak spindle gall, Amphibolips coelebs O. S.

Elongate, fusiform, stemmed leaf gall mostly on the margin, sometimes on the surface, length of stems 5 mm, of the fusiform gall 3 to 4 mm, on Q. alba. Osten Sacken '61, p. 61

Cynipid. Small oak spindle gall, Andricus fusiformis O. S.

Slender, globe-shaped, leaf galls nearly 12 mm long, the stalk twice as long as the swelling, the surface pubescent, on Q. prinoides Fitch '51, p. 820

Cynipid. Andricus chinquapin Fitch

Monothalamous, marginal, stemmed leaf gall, length of stem 12 to 18 mm, length of gall 10 mm, diameter of gall 3 mm, on Q. bicolor. Fig. 110, Bassett '81, p. 101

Cynipid. Oak capsule gall, Andricus capsulus Bass.

Fusiform, stemmed, green or dark olive-brown leaf gall with a free cell within, length 4 to 5 mm, diameter 2.5 to 3 mm, on Q. rubra and Q. coccinea. Fig. 99, 8, 9. Beutm. '11d, p. 366

Cynipid. Dryophanta pedunculata Bass.

Fusiform, pedunculate, smooth, reddish brown vein gall, length 8 to 10 mm, the stem slender, smooth, length mm. Cal. Trotter '11, p. 105

Cynipid. Andricus pseudo-callidoma Trott.

Globose or fusiform, stemmed, smooth, shining, dark-brown leaf gall, length 4 cm, greatest diameter 3.5 to 4.5 mm, length of stem 4 to 6 or 8 mm. Mex. Trotter '11, p. 123

Cynipid. ? Andricus longepedunculatus Trott.

(18) Presumably leaf galls, the gall unknown

Reared from oak, presumably from a gall resembling that made by Cynips. Felt '08e, p. 391

Itonid. Thecodiplosis quercifolia Felt

Probably reared from oak leaves. Felt '07a, p. 137

Itonid. Dicrodiplosis quercina Felt

7 *Galls of the aments or catkins*

Clavate, irregular, rather angulate, thin-shelled, polythalamous, clustered, staminate, brown, ament gall, diameter 3 or 4 mm, on Q. agrifolia. Fullaway '11, p. 339

Cynipid. Dryophanta dubiosa Fullw.

Globular, woolly gall, diameter 12 mm, on Q. aquatica. Ashm. '81, p. XVI

Cynipid. Andricus turneri Ashm.

Rounded, shotlike, greenish white, soft, spongy, polythalamous gall on red oak catkins. Pl. 2, fig. 7. Bassett '90, p. 73

Cynipid. Oak flower gall, Callirhytis pulchra Bass.

Conical, monothalamous blossom galls, dark brown or black when dry, length 2.5–3 mm, on Q. myrtifolia. Beutm. '17, p. 346

Cynipid. Andricus myrtifoliae Beutm.

Ovate, smooth, blossom galls, diameter 1 mm, on Q. cinerea. Ashm. '87, p. 143

Cynipid. Andricus blastophagus Ashm.

Nodular enlargements of the flower cluster, more or less concealed by the floret. They are small, succulent and shrivel soon after the flies emerge, on Q. minor. See also, fig. 107, 1–3. Beutm. 10c, p. 123

Cynipid. Oak flake gall, Neuroterus floccosus Bass.

Oval, small, short, dark slate colored, ament galls, length 1.25 mm, diameter 1 mm, on Q. obtusiloba. Bassett '00, p. 318

Cynipid. Andricus exiguus Bass.

Small, black, polythalamous galls in sterile florets of Q. ilicifolia, occasionally very abundant, diameter 2.5 mm. Bassett '90, p. 79

Cynipid. Callirhytis clarkei Bass.

Globose, monothalamous, pale wood colored galls in dense clusters near the ends of the aments, on Q. platanoides. Fig. 53, 7. Beutm. '10c p. 129

Cynipid. Oak flower stem gall, Neuroterus pallidus Bass

Globose, moderately thick-shelled, yellowish, almost smooth, pithy gall, diameter 20 to 35 mm, possibly on oak blossoms. Fig. 111, 8, 9. Beutm. '09b, p. 65.

Cynipid. Amphibolips trizonata Ashm.

Reared from undescribed oak blossom galls. Felt '08e, p. 325

Itonid. Lasioptera querciflorae Felt

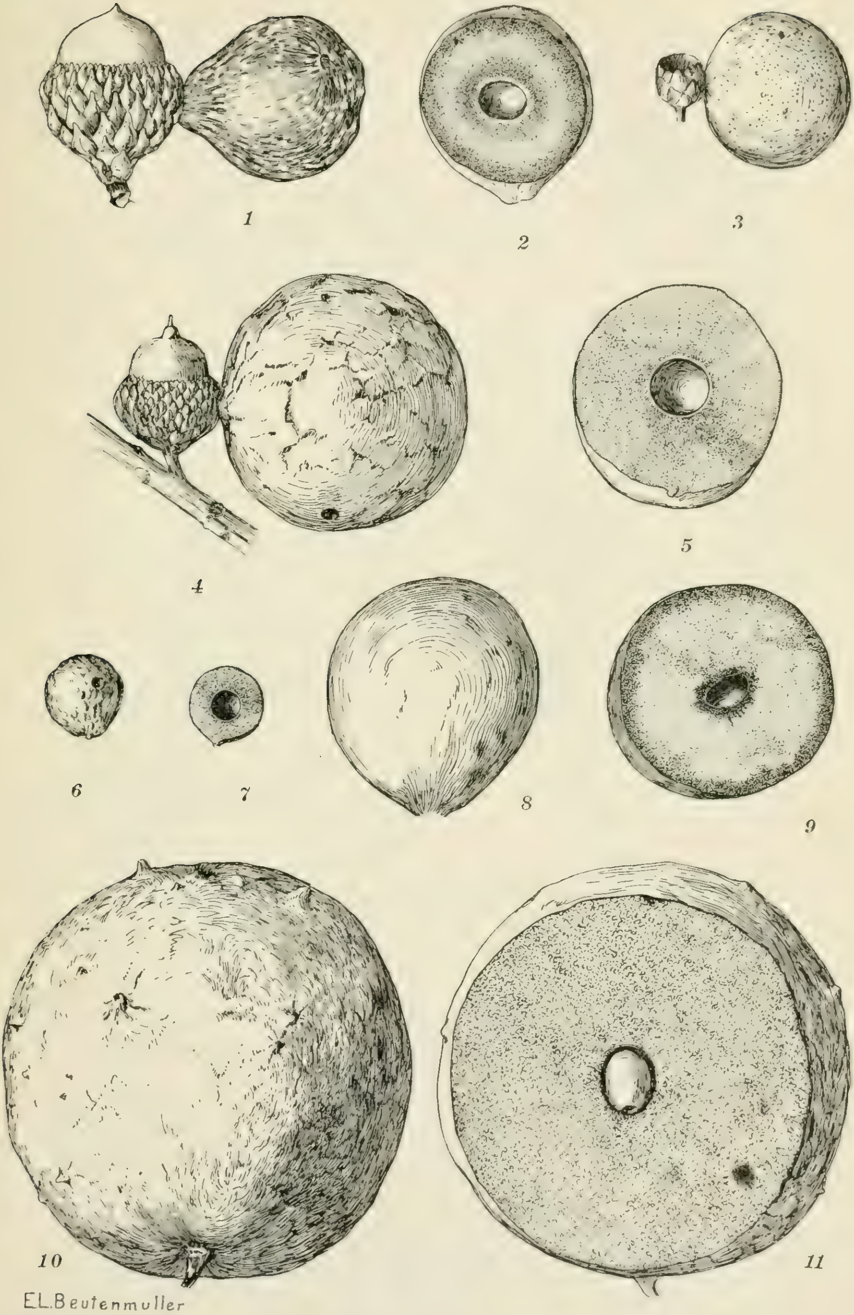

Fig. 111. Oak apples. 1–3. Acorn plum gall, Amphibolips prunus Walsh. 4, 5. A. gainesi Bass. 6, 7. A. fuliginosa Ashm. 8, 9. A. trizonata Ashm. 10, 11. Palmer's oak apple, A. palmeri Bass. (After Beutm., Am. Mus. Nat. Hist.)

8 *Galls of the fruits*

a Galls of the acorn

Inhabiting apparently normal, small acorns or those slightly deformed, on Q. ilicifolia. Pl. 1, fig. 7. Beutm. '13e, p. 105

Cynipid. Andricus perditor Bass.

White kernel or larval cell in the meaty portion of acorns, though sometimes outside near its base and hidden by the cup, on scarlet, red and black oak and probably in others of the red oak group. Beutm. '13e, p. 102

Cynipid. Callirhytis fruticola Ashm.

Gall similar to that of C. fruticola probably new, and occurring in the acorns of swamp oak, Q. platanoides, found by L. H. Weld. Beutm. '13e, p. 102

Cynipid. ? Callirhytis sp.

Acorns containing rounded bodies or larval cells, sometimes filling the whole interior and resembling those of C. fruticola, on Q. agrifolia. Beutm. '13e, p. 105

Cynipid. Andricus eldoradensis Beutm.

Acorns containing 1 to 5 or 6 pseudochestnut-shaped galls, the latter varying in size from that of a flax seed to a length of 8 mm (spring form, C. operatola Ril. & Bass.) Bassett '00, p. 315

Cynipid. Andricus operator O. S.

Monothalamous acorn galls at the tip of leaf twigs, double, the basal portion smaller and telescoped in the upper part, rugose, with a whitish bloom, length 15 mm, on Q. chrysolepis. Fullaway '11, p. 363

Cynipid. Callirhytis sanctae-clarae Fullw.

Bud gall, possibly acorn gall composed of a basal, oblate part with a height of 3 to 4 mm and a distal conico-pyramidal portion with a height of 10 to 12 mm and a diameter of 8 to 12 mm, the larval cell in the basal portion. Trotter '11, p. 109

Cynipid. Disholcaspis sp.

Reared from larvae found between the seed coats of an acorn. Felt '15e, p. 137

Itonid. Dasyneura glandis Felt

b Galls of the acorn cup (cupule)

Globose, bright red acorn-cup gall, the fresh flesh pink, shading to yellow toward the middle, at maturity blood-red, diameter 15 to 25 mm, on Q. rubra, Q. nana, Q. velutina and Q. coccinea in August and September. Fig. 111, 1–3. Beutm. '09b, p. 62

Cynipid. Acorn plum gall, Amphibolips prunus Walsh

Globular, smooth, densely corky, acorn-cup gall, internally rusty brown, with a large larval cell, diameter 24 to 42 mm, on Q. marilandica. Fig. 111, 4, 5. Beutm. '09b, p. 63

Cynipid. Amphibolips gainesi Bass.

Irregular, monothalamous, conical swellings of the cupule, length 5 mm, diameter 2 mm, on Q. platanoides, Q. macrocarpa, Q. prinoides and Q. prinus. Beutm. '13e, p. 103

Cynipid. Andricus glandulus Beutm.

Flattened, toothlike or wedge-shaped galls on the outside of the acorn and between the cup and the acorn, the ends usually protruding more or less on red, scarlet, black and scrub oak (fall form). Pl. 2, fig. 5. Beutm. '13e, p. 103

Cynipid. Andricus operator O. S.

Seedlike capsule in acorn cup, on Q. alba, Q. prinus and allied oaks. Pl. 3, fig. 4. Riley '75, p. 577

Cynipid. Cynips glandulosus Riley

Globose, small, red, smooth, corky, probably acorn galls, diameter 8 to 12 mm, on Q. laurifolia. Fig. 111, 6, 7. Beutm. '13e, p. 102

Cynipid. Amphibolips fuliginosa Ashm.

9 *Supplementary list of gall-making Cynipids, the galls being unknown*

Amphibolips montana Beutm. '13 Insec. Inscit. Menst., 1:122
A. nigra Beutm. '11 Ent. News, 22:198
A. verna Bass. '00 Am. Ent. Soc. Trans., 26:321

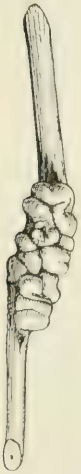

Fig. 112. Woolly elm louse, Schizoneura rileyi Thos. Twig enlargement. (Original)

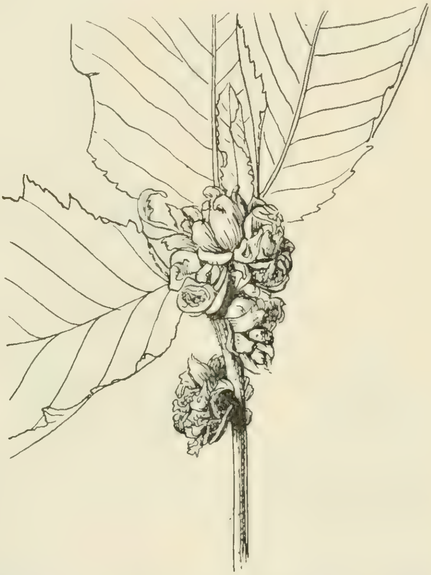

Fig. 113. Aborted buds on slippery elm, possibly the work of Dasyneura ulmea Felt. (Original)

Andricus ashmeadi Bass. '00 Am. Ent. Soc. Trans., 26:320
A. aztectus Cam. '97 Ann. Nat. Hist., 19:261
A. brevicornis Beutm. '13 Am. Ent. Soc. Trans., 39:245
A. ignotus Bass. '00 Am. Ent. Soc. Trans., 26:317
A. incertus Bass. '00 Am. Ent. Soc. Trans., 26:317
A. durangensis Beutm. '11 Ent. News, 22:198
A. lustrans Beutm. '13 Am. Ent. Soc. Trans., 39:244
A. obtusilobae Bass. '00 Am. Ent. Soc. Trans., 26:316
A. patiens Bass. '00 Am. Ent. Soc. Trans., 26:312
A. pulchellus Bass. '00 Am. Ent. Soc. Trans., 26:314
Aylax quinquecostata Prov. '80 Nat. Canad., 14:20
A. rufipes Cam. '84 Ent. Soc. Lond. Trans., p. 485
Aulacidea harringtoni Ashm. '87 Am. Ent. Soc. Trans., 14:146
Callirhytis arcuata Kieff. '09 Lab. Zool. Portici Bul., 4:341

C. defecta Kieff. '09 Lab. Zool. Portici Bul., 4:116

Chilaspis ferrugineus Gill. '90 Ill. State Lab. of Nat. Hist. Bul., 3:200

Cynips flavicollis Ashm. '96 U. S. Nat. Mus. Proc., 19:123

C. gibbosa Prov., '81 Nat. Canad., 12:232

Diastrophus piceus Prov. '86 Add. Faune Canad., Hym., p. 161

Disholcaspis heynei Kieff. '09 Lab. Zool. Portici Bul., 4:113

Dryophanta corrugis Bass. Beutm. '11 Amer. Mus. of Nat. Hist. Bul., 30:353

D. parvula Bass. '00 Am. Ent. Soc. Trans., 26:326

D. pulchella Beutm. '14 Ent. News, 22:357

Holocynips emarginata Kieff. '09 Lab. Zool. Portici Bul., 4:114

Neuroterus dubius Bass. '00 Am. Ent. Soc. Trans., 26:335

N. crassitelus Prov. Nat. Can., 12:233

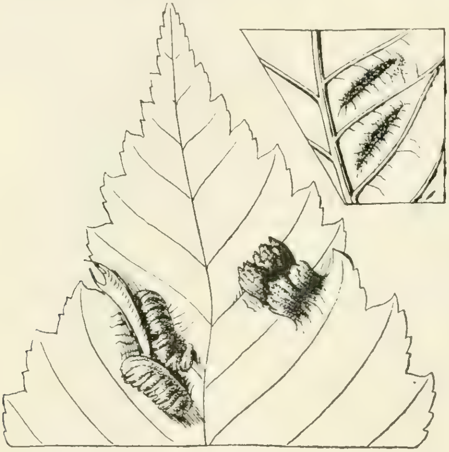

Fig. 114. Cockscomb elm gall, Colopha ulmicola Fitch, showing upper and lower surface of leaf. (Original)

Phamacis americana Baker. '96 Can. Ent., 28:131

Trissandricus maculipennis Kieff. '09 Lab. Zool. Portici Bul., 4:115

Urticaceae (nettle family)

Ulmus (elm)

Reared from larvae under decaying bark. Felt '13m, p. 224

Itonid. Oligarces ulmi Felt

Knotty growths on the trunk and branches, usually covered with woolly plant-lice, on U. americana. Fig. 112. Felt '06b, p. 192

Aphid. Woolly elm louse, Schizoneura rileyi Thos.

Aborted or blasted buds. Fig. 113, pl. 10, fig. 3. Felt '15e, p. 171

Itonid. Dasyneura ulmea Felt

Blasted leaf buds or adherent, immature leaf clusters. Pl. 11, fig. 6. Felt '12f, p. 240

Itonid. Phytophaga ulmi Beutm.

Thickened, green or reddish, crested, cockscomb-shaped ridges arising from lateral veins, length 10 to 15 mm, height 8 mm. Fig. 114. Felt '06b, p. 186

Aphid. Cockscomb elm gall, Colopha ulmicola Fitch

Spindle-shaped, hollow gall on the upper surface of the leaf, variable in size, length about 15 mm, on slippery elm. Fig. 115. Felt '15e, p. 58

Aphid. Slippery elm pouch gall, Pemphigus ulmifusus Walsh

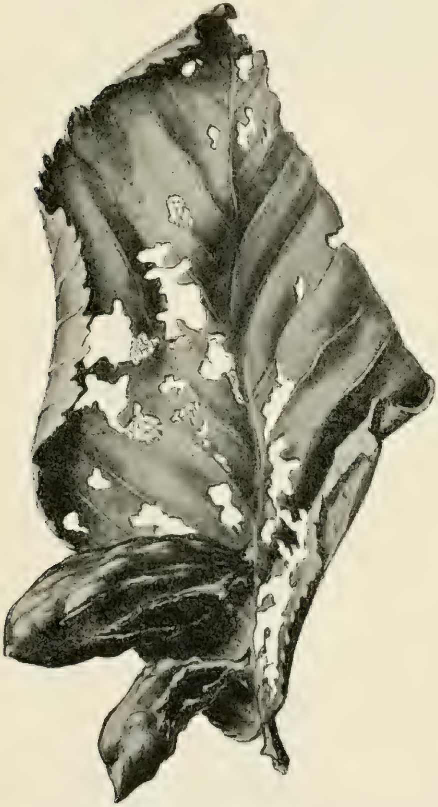

Fig. 115. Slippery elm pouch gall, Pemphigus ulmifusus Walsh. (Author's illustration)

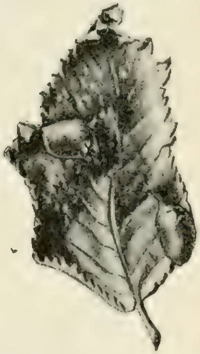

Fig. 116. Elm sack gall, Tetraneura ulmisacculi Patch. (Author's illustration)

Globose, subsessile, yellowish green, sometimes pink-tinted leaf gall, diameter 5 to 12 mm, on U. montana. Fig. 116. Felt '15e, p. 57

Aphid. Elm sac gall, Tetraneura ulmisacculi Patch

Curled and twisted leaves containing numerous mealy-covered Aphids, on U. americana. Felt '06b, p. 177

Aphid. Elm leaf aphid, Schizoneura americana Ril.

Globose, green or yellowish green, pocket galls, on U. americana, U. racemosa, U. fulva. Chadwick '08, p. 149

Acarid. Eriophyes sp.

Large, pouch gall, diameter 1 to 2 cm, on U. fulva. Chadwick '08, p. 149
Acarid. Eriophyes sp.

Pubescent, pouch gall, diameter 3 to 6 mm, on U. fulva. Chadwick '08, p. 149
Acarid. Eriophyes sp.

Whitish erineum on the under side of the leaf of U. racemosa. Chadwick '08, p. 150
Acarid. Eriophyes sp.

Celtis (hackberry)

"Witch-broom" on branches and twigs. Chadwick '08, p. 130
Acarid. Eriophyes sp.

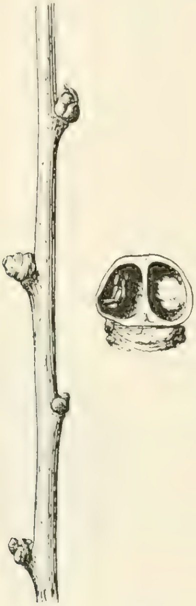

Fig. 117. Hackberry bud gall, Pachypsylla gemma Riley. Infested twig and one gall in section, the latter enlarged. (Original)

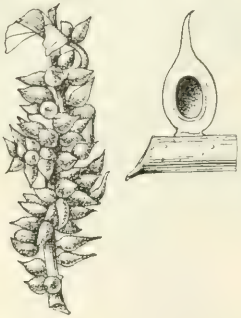

Fig. 118. Hackberry flask gall, Phytophaga celtiphyllia Felt. Cluster of galls and one in section, the latter enlarged. (Original)

Hollow, elongate twig swellings, length 1.25 to 2.5 cm. Patton '97, p. 247
Itonid. Cecidomyia deserta Patt.

Fusiform bud gall, length 1.5–3 cm, diameter 4–6 mm. Wells '16, p. 258
Lepidopt. ? Proteoteras aesculana Ril.

Twig galls resembling seed capsules of Rumex, apically with a spine about one-half the length of the gall, the height, excluding the spine, 4.5 mm, the diameter approximately the same. Pack. '90, p. 613
Itonid. Cecidomyia semenrumicis Patt.

Bud-shaped, polythalamous twig gall without an opening. Fig. 117. Pack. '90, p. 615

Hemip. Hackberry bud gall, Pachypsylla gemma Ril.

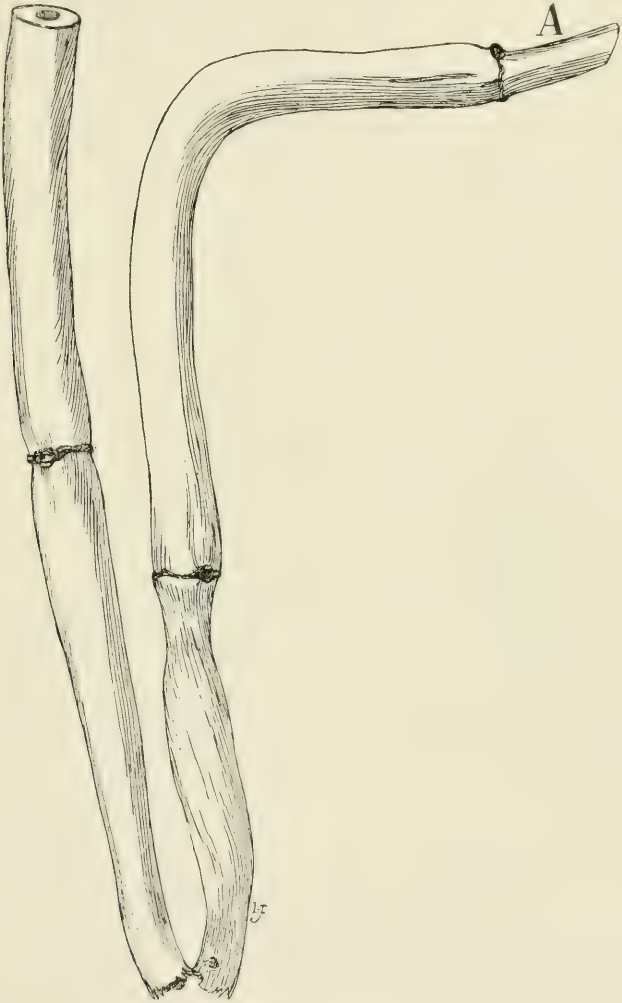

Fig. 119. Hop stem gall, Lasioptera humulicaulis Felt.
(Author's illustration)

Conical, spine-shaped leaf gall on the under surface and arising from a circular, yellowish base, height 4 mm, diameter 2.8 mm. Pack. '90, p. 614

Itonid. Spiny hackberry gall, Cecidomyia spiniformis Patt.

Globular, subsessile, small leaf gall with a small impression at the top, not pubescent. Pack. '90, p. 621

Hemip. Pachypsylla globulus Ril.

Top-shaped, monothalamous, moderately thick leaf gall, the surface sparsely clothed with whitish, appressed pubescence, the greatest diameter 3 to 4 mm. Felt '16f, p. 190

Itonid. Phytophaga wellsi Felt

Rosette-shaped, ribbed leaf gall resembling the seed capsule of Hibiscus, on under surface of leaf, diameter 2 to 3 mm. Pack. '90, p. 614

Itonid. Cecidomyia capsularis Patt.

Reniform, large, petiole gall involving the base of the leaf and with an opening, polythalamous. Pack. '90, p. 617

Hemip. Hackberry petiole gall, Pachypsylla venusta O. S.

Mammiform, very large leaf gall without a depression or rim on the top, usually not pubescent, sometimes with a slight down at the base, diameter 4.5 mm. Pl. 14, fig. 2. Pack. '90, p. 619

Hemip. Hackberry nipple gall, Pachypsylla mamma Ril.

Elevated, mammiform, with a long nipple-like protuberance, diameter 6 mm, on under surface of leaf of C. reticulata. Cockerell, '10, p. 180

Hemip. Pachypsylla rohweri Ckll.

Subglobular, sessile, smaller leaf gall with long hairs and with a smooth, shining impression on the upper surface, diameter 3 mm. Pack. '90, p. 620

Hemip. Pachypsylla pubescens Ril.

Leaf gall resembling that of Pachypsylla pubescens but with no cup-shaped depression on the upper surface of the leaf, diameter 3.5 to 4 mm. Pack. '90, p. 613

Itonid. Cecidomyia pubescens Patt.

Circular, depressed leaf gall on the upper surface, the outer rim depressed, the central part slightly raised and with a median spine; wartlike on the under surface, much flattened and with a depression in the middle; height 2 mm, diameter 5 mm. Pack. '90, p. 619

Hemip. Hackberry button gall, Pachypsylla umbilicus Ril.

Star-shaped or flower-shaped leaf gall and not forming a depression on the under side, on the upper surface blisterlike, height 1.25 mm, diameter 5 mm. Pack. '90, p. 618

Hemip. Hackberry star gall, Pachypsylla asteriscus Ril.

Blisterlike, yellowish, monothalamous gall occurring on both sides of the leaf and hardly raised above the surface. Pack. '90, p. 618

Hemip. Hackberry blister gall, Pachypsylla vesiculum Ril.

Globose, not pubescent, sessile leaf gall, wider than high, much flattened on the top and usually with two concentric, elevated rims and a central nipple. Pack. '90, p. 621

Hemip. Hackberry melon gall, Pachypsylla cucurbita Ril.

Conical, flask-shaped or subglobular, slightly ribbed, greenish leaf or tender twig gall arising from a circular, truncate base, diameter 3.4 mm. Fig. 118. Felt '08e, p. 371

Itonid. Hackberry flask gall, Phytophaga celtiphyllia Felt (oviformis Patt.)

Subconical leaf gall, clustered on the under surface, length 3 to 5 mm. Beutm. '07c, p. 388

Itonid. Cecidomyia unguicula Beutm.

Subconical, solitary or compound leaf, stem, petiole or fruit gall with a bluntly truncate, dehiscent larval cell, diameter about 4 mm. Wells '16, p. 277
Itonid. Cecidomyia sp.

Humulus (hop)

Swollen stems, diameter 1 cm, length 4 to 50 cm. Fig. 119. Felt. '07a, p. 151
Itonid. Hop stem gall, Lasioptera humulicaulis Felt

Urtica (nettle)

Globose, hoary, pubescent, yellowish white gall on the under surface of the leaf, diameter 4 mm. Pl. 7, fig. 8. Felt '11j, p. 474
Itonid. Nettle bullet gall, Cecidomyia sp.

Urn-shaped, subsessile, pale green midrib or vein gall, diameter 3 mm. Osten Sacken '75, p. 202
Itonid. Nettle urn gall, Cecidomyia urnicola O. S.

Laportea (wood nettle)

Irregular, oval, stem gall. Felt '11j, p. 463
Itonid. Cecidomyia sp.

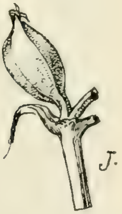

Fig. 120. Cecidomyia sp. Bud gall on Laportea. (Original)

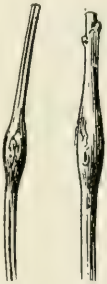

Fig. 121. Cecidomyia boehmeriae Beutm. Stem gall. (Original)

Irregular, probably bud gall, length 1.2 cm. Fig. 120. Felt '11j, p. 463
Itonid. Cecidomyia sp.

Boehmeria (false nettle)

Fusiform stem gall, length 12 mm, diameter 6 mm. Fig. 121. Beutm. '08, p. 74
Itonid. Cecidomyia boehmeriae Beutm.

Aristolochiaceae (birthwort family)

Aristolochia (birthwort)

Ovate leaf gall, diameter 4 mm. Hagen '81, p. 37
Itonid. Cecidomyia hageni Aldr.

Small, woolly capsule on under surface of the leaf, on A. macrophylla. Chadwick '08, p. 127
? Acarid. Eriophyes sp.

Polygonaceae

Eriogonum

Elongate, bud swelling. Felt, '11j, p. 460

Itonid. Cecidomyia sp.

Rumex (dock)

Reared from deformed, reddish seeds. Felt, '08e, p. 392

Itonid. Dock seed midge, Contarinia rumicis Loew

Reared from same gall. Felt, '08e, p. 410

Itonid. Lestodiplosis rumicis Felt

Coccolobis revifera (sea grape)

Blister leaf gall, dark green, with a darker median nipple showing equally on both surfaces, diameter 5 mm. Fig. 122, Felt, '15a, p. 199

Itonid. Sea grape blister, Ctenodactylomyia watsoni Felt

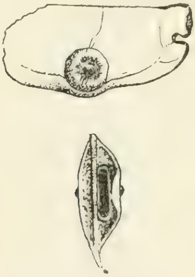

Fig. 122. Sea grape blister gall, Ctenodactylomyia watsoni Felt. Gall and one in section, the latter enlarged. (Original)

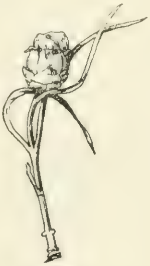

Fig. 123. Greasewood bud gall, Onodiplosis sarcobati Felt. (Original)

Chenopodiaceae (goosefoot family)

Eurotia

Irregular bud galls. Felt, '11j, p. 460

Itonid. Cecidomyia sp.

Sarcobatus vermiculatus (greasewood)

Irregularly oval bud galls, fleshy, becoming hard and apparently composed of closely appressed, thickened bud scales, length 10 mm, diameter 6 mm. Fig. 123. Felt, '16f, p. 176

Itonid. Greasewood bud gall, Onodiplosis sarcobati Felt

Somewhat produced, axillary, rosette bud galls, length 1.5 cm, diameter .5 cm. Collected by L. H. Weld.

Dipt. Trypetid a2772

Swollen, folded leaflets, length 12 mm, diameter 1.5 mm. Felt, '16c, p. 202

Itonid. Greasewood leaf gall, Protaplonyx hagani Felt

Oval leaf swellings. Felt '14i, p. 93
Itonid. Aplonyx sarcobati Felt

Atriplex

Irregular, subglobular bud galls with sparse, long hairs, diameter 8 to 9 mm. Fig. 124. Cockerell '96, p. 402. Felt '16d, p. 139
Itonid. Atriplex bud midge, Asphondylia neomexicana Ckll.

Fleshy, polythalamous, tumorlike twig gall, length 12 mm, diameter 4.5 to 6 mm. Fig. 125. Amer. Nat. 29:766. Felt '16d, p. 138
Itonid. Atriplex tumor gall, Asphondylia atriplicis Ckll.

Irregular twig gall, length 1.5 mm, diameter 5 mm. Fig. 126. Cockerell '98, p. 327
Itonid. Lasioptera willistoni Ckll.

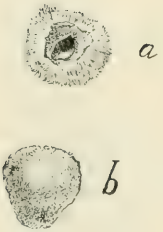

Fig. 124. Atriplex bud midge, Asphondylia neomexicana Ckll. (Author's illustration)

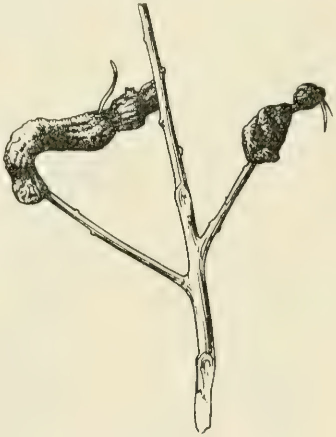

Fig. 125. Atriplex tumor gall, Asphondylia atriplicis Ckll. (Original)

Circular, pustulate leaf gall, diameter 2.5 mm. Cockerell '98, p. 326
Itonid. Atriplex leaf blister, Cecidomyia atriplicicola Ckll.

Woolly masses 1 to 2 cm long on the stems, evidently appressed, aborted leaves, on A. ?polycarpa
Itonid. Asphondylia ? atriplicis Ckll. a2893

Globose, sessile, whitish, short-haired galls, diameter 4 mm, on A. confertifolia
Itonid. Asphondylia atriplicis Ckll.

Subglobose or lenticular, apposed leaf galls, diameter 3 to 4 mm, length 6 or 7 mm. Cockerell and Rohwer, '08, p. 169. Fig. 127
Hemip. Atriplicia ?gallicola Ckll. a2478

Longitudinally curled, apposed leaves, length 5 to 6 mm, diameter 1 to 1.5 mm. Fig. 128

Hemip. Coccid sp. a2479

Suaeda or Dondia (Sea blite)

Blackish, globose, sessile, leafy deformations, diameter 3 mm. Felt '18d, p. 381

Itonid. Asphondylia dondiae Felt, MS.

Phytolaccaceae (poke weed family)

Rivina (rouge-plant)

Reared from bud gall. Felt '16d, p. 112

Itonid. Schizomyia rivinae Felt

Nyctaginaceae (four-o'clock family)

Oxybaphus

Stem gall, length 1.5 to 2 cm. Felt '11k, p. 482

Itonid. Lasioptera allioniae Felt

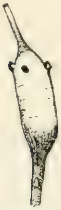

Fig. 126. Lasioptera willistoni Ckll. (Original)

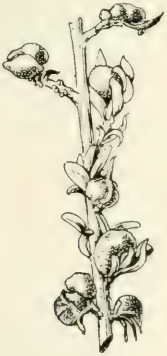

Fig. 127. Coccid gall on Atriplex, a2478 (Original)

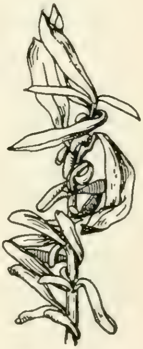

Fig. 128. Coccid gall on Atriplex casnescens, a2479. (Original)

Pisonia

Subconic, stem gall on P. aculeata. Felt '11k, p. 547

Itonid. Feltomyia mexicana Felt

Oval leaf gall on P. nigricans. Felt '12b, p. 353

Itonid. Feltomyia pisonifolia Felt

Irregular stem swellings on P. nigricans. Felt '12a, p. 174

Itonid. Feltomyia pisoniae Felt

Ranunculaceae (crowfoot family)

Thalictrum (meadow rue)

Enlarged seed pods, length 8 mm. Felt '11k, p. 547

Itonid. Meadow rue seed midge, Asphondylia thalictr

Fel

Reared from same gall and probably zoophagous. Felt '11j, p. 473
Itonid. Trotteria sp.

Anemone (Anemone)

Slightly enlarged, loose bud gall on A. canadensis. Felt '15e, p. 139
Itonid. Anemone bud gall, Dasyneura anemone Felt

Golden brown erineum on the under side of the leaf of A. virginiana. Chadwick '08, p. 127
Acarid. Eriophyes sp.

Clematis (Virgins bower)

Oval stem gall, length 2 cm, diameter 1 cm. Pl. 4, fig. 1. Thompson '15, p. 82
Dipt. Agromyza sp.

Irregular, subglobular bud gall, diameter 1 cm. Pl. 9, fig. 4. Felt '08e, p. 393
Itonid. Clematis bud gall, Contarinia clematidis Felt

Irregular, subglobular bud gall, diameter 1 cm. Felt '15e, p. 147
Itonid. Dasyneura clematidis Felt

Ovate, reddish brown, axillary bud gall, diameter 4 mm. Felt '07e, p. 287
Itonid. Neolasioptera clematidis Felt

Enlarged, reddened, flower buds. Felt '07e, p. 302
Itonid. Clematis flower midge, Prodiplosis floricola Felt

Unopened, apparently normal flowers, probably predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis clematiflorae Felt

Small, short, whitish tubes, open at the end, in crowded patches on leaves, bud stalks and buds. Chadwick '08, p. 131
Acarid. Clematis mite gall, Eriophyes sp.

Paeonia (peony)

Reared from decaying roots. Felt '11k, p. 476
Itonid. Joannisia pennsylvanica Felt

Magnoliaceae (magnolia family)

Liriodendron (tulip tree)

Globular, midrib or vein gall, monothalamous, length 5 mm.
Itonid. Tulip vein gall, Cecidomyia sp.

Midrib, irregular, polythalamous leaf gall, length 1.5 cm. Osten Sacken '62, p. 202
Itonid. Tulip midrib gall, Cecidomyia tulipiferae O.S.

Purplish blister gall on the leaf, diameter about 3 mm. Pl. 10, fig. 7. Osten Sacken '62, p. 202
Itonid. Tulip spot gall, Thecodiplosis liriodendri O.S.

Lauraceae (laurel family)

Sassafras

Reared from curling leaves of S. variifolium. Felt '06a, p. 29
Itonid. Sassafras leaf midge, Dasyneura sassafras Felt

Benzoin (spicebush)

Leaves with margins rolled.

Itonid. Cecidomyia sp.

Irregular, subcortical gall, length .5 to 2 cm. Fig. 129. Beutm. '07, p. 398

Itonid. Spicebush stem gall, Lasioptera linderae Beutm.

Papaveraceae (poppy family)

Papaver (poppy)

Reared from undescribed stem gall. Insect Life, 7:401

Itonid. Clinodiplosis caulicola Coq.

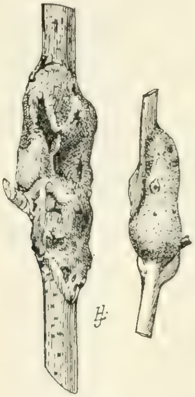

Fig. 129. Spicebush stem gall, Lasioptera linderae Beutm. (Author's illustration)

Cruciferae (mustard family)

Lepidium (peppergrass)

Swollen, discolored seed capsules. Felt '15e, p. 154

Itonid. Peppergrass seed midge, Dasyneura lepidii Felt

Sisymbrium (hedge mustard)

Irregular bud gall, diameter 8 mm.

Itonid. Dasyneura ?sisymbrii Schr.

Stanleya glauca

Swollen flower with thickened, enlarged sepals and containing many pale larvae. Cockerell '14, p. 240

Itonid. Dasyneura stanleyae Ckll.

Capparidaceae (Caper family)

Cleome serrulata (Stinking clover)

Claviform or variously enlarged seed pods. Ckll. '13, p. 279
Itonid. Cecidomyia peritomatis Ckll.

Crassulaceae

Clementsia (red orpine)

Globose, crimson-lake deformations of flower heads. Ckll., Ent. News, 25:466
Acarid. Eriophyes sp.

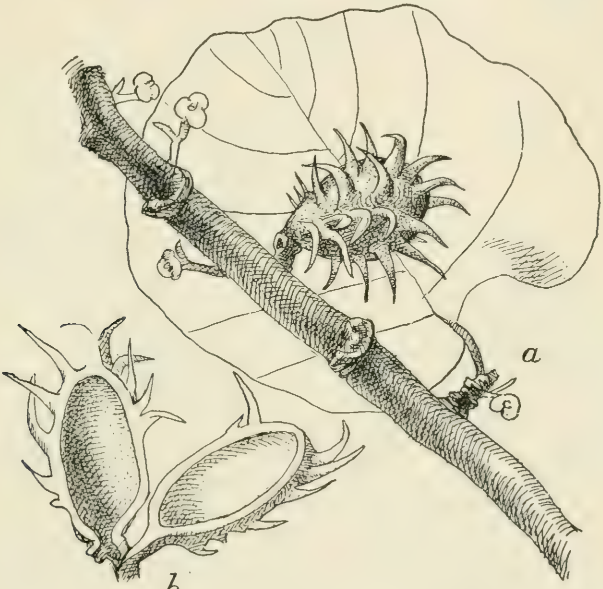

Fig. 130. Spiny witch-hazel gall, Hamamelistes spinosus Shim. (After Pergande)

Saxifragaceae (saxifrage family)

Hydrangea arborescens (wild Hydrangea)

Bud gall, length 1 cm. Felt '16d, p. 136
Itonid. Hydrangea bud gall, Asphondylia hydrangeae Felt

Ribes (currant, gooseberry)

Arrested gooseberry bud. Pl. 12, fig. 8. Felt '11i, p. 347
Itonid. Gooseberry bud midge, Rhopalomyia grossulariae Felt

Red, prematurely ripe currants. Fitch '55, p. 880
Itonid. Currant midge, Dasyneura grossulariae Fitch

Irregular, greenish or dark brown blister leaf gall, diameter 3 mm, on R. longiflorum, also on Grossularia inermis. Felt '11j, p. 468

Itonid. Currant leaf blister, Cecidomyia sp.

Gall undescribed, on R. menziesii. Felt '08e, p. 370

Itonid. Phytophaga californica Felt

Hamamelidaceae (witch-hazel family)

Hamamelis (witch-hazel)

Many-spined, green or reddish, oval bud gall, length 2 cm, diameter 1 cm. Fig. 130, Felt '06b, p. 246

Aphid. Spiny witch-hazel gall, Hamamelistes spinosus Shim.

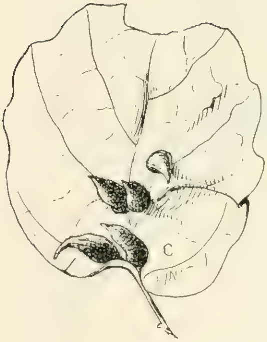

Fig. 131. Witch-hazel cone gall, Hormaphis hamamelidis Fitch. (Original)

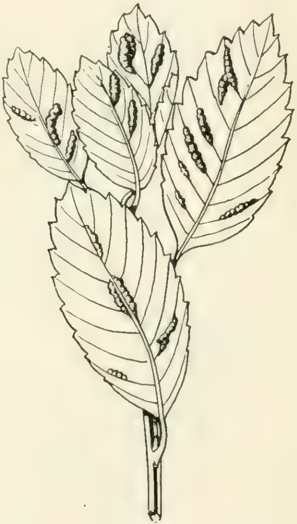

Fig. 132. Eriophyes galls on Exochorda. (Original)

Fleshy vein folds, length 2 cm. Felt '11j, p. 461

Itonid. Cecidomyia sp.

Purplish, corrugated folds between veins. Felt '11j, p. 461

Itonid. Cecidomyia sp.

Greenish blister leaf gall, diameter 3 to 4 mm. Felt '11k, p. 481

Itonid. Asteromyia nigrina Felt

Purplish blister leaf gall, diameter 5 mm. Felt '11j, p. 461

Itonid. Cecidomyia sp.

Conical, greenish or reddish gall on the upper surface of the leaf, diameter 5 mm, length 12 mm. Fig. 131. Felt '06b, p. 246

Aphid. Witch-hazel cone gall, Hormaphis hamamelidis Fitch

Liquidambar (sweet gum)

A tawny or brown erineum on the under surface of the leaf, in the angles of the veins and close to the petiole. Chadwick '08, p. 152
Acarid. Eriophyes sp.

Platanaceae (plane tree family)

Platanus (buttonwood)

Reared from rolled leaves, probably predaceous on plant lice. Felt '08e, p. 410
Itonid. Lestodiplosis platanifolia Felt

Exochorda

Small, confluent, lobulate leaf vein swelling, diameter 1 mm, length 4 to 6 mm. Fig. 132
Acarid. Eriophyes sp.

Rosaceae (rose family)

Spiraea latifolia (meadow sweet)

Slightly enlarged, reddened flowers. Felt '07e, p. 304
Itonid. Spiraea flower midge, Itonida spiraeaflorae Felt

Reared from unopened flowers. Felt '07e, p. 302
Itonid. Prodiplosis floricola Felt

Globose axillary bud galls. Pl. 14, fig. 9
Cecid. Cecidomyia sp.

Deformed, deep-red or purplish and greenish leaf buds, length 1 cm, diameter 4 mm. Felt '11j, p. 472
Itonid. ? Asphondylia sp.

Terminal, globular, usually green bud gall, diameter 4 mm. Felt '08a, p. 388
Itonid. Lobular bud gall, Hormomyia clarkeae Felt

Terminal, oval, brown bud gall, diameter 3 mm. Felt '11k, p. 555
Itonid. Itonida spiraeina Felt

Terminal, clustered bud gall, diameter 3 mm, length 7 mm. Felt '11k, p. 553
Itonid. Clustered bud gall, Parallelodiplosis clarkei Felt

Terminal "cabbage" or "lettuce" bud gall. Felt '11k, p. 547
Itonid. Spiraea cabbage gall, Contarinia spiraeina Felt

Terminal bud gall, the leaflets fringed, diameter 3 to 4 mm. Felt '11j, p. 473
Itonid. Fringed bud gall, Cecidomyia sp.

Arrested development of flower buds. Chadwick '08, p. 148
Acarid. Eriophyes sp.

Conic leaf gall forming a pustule on the under side, diameter 4 mm, height 2 mm. Fig. 133
Itonid. Cecidomyia sp.

Yellowish brown, spotted, blister leaf gall, diameter 3 mm. Felt '09e, p. 287
Itonid. Lasioptera spiraeafolia Felt

Thickened, greenish, midrib fold, length 1 to 1.5 cm, diameter .5 cm. Pl. 12, fig. 1. Felt '15e, p. 106
Itonid. Spiraea pod gall, Rhabdophaga salicifolia Felt

Apparently reared from the same gall, probably predaceous. Felt '08e, p. 410
Itonid. Lestodiplosis spiraeafolia Felt

Marginal leaf rolls, length 3 mm. Fig. 134. Felt '09e, p. 293
Itonid. Spiraea leaf roll, Parallelodiplosis spirae Felt

Pyrus (apple, pear)

Deformed, especially globose, young pears. Felt '13m, p. 97
Itonid. Pear midge, Contarinia pyrivora Riley

Deformed young apples and rudimentary or infertile seeds. Crosby '09, p. 369
Hym. Pear seed wasp, Syntomaspis druparum Boh.

Irregular, sinuous bark elevations on the trunks and branches of pear trees
Coleop. Sinuate pear borer, Agrilus sinuatus Oliv.

Greenish or brown, blister leaf galls on both pear and apple. Parrott et al. '06, p. 291
Acarid. Pear blister mite, Eriophyes pyri Pgst.

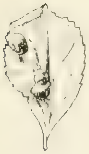

Fig. 133. Cecidomyia sp. Gall on Spiraea. (Original)

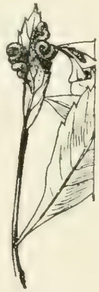

Fig. 134. Spiraea leaf roll, Parallelodiplosis spirae Felt. (Original)

An erineum on the under side of the leaves of American crab apple. Chadwick '08, p. 141
Acarid. Eriophyes sp.

Cercocarpus parvifolius

Bud gall. Felt '13h, p. 215
Itonid. Dasyneura cercocarpi Felt

Aronia nigra (black chokeberry)

Tiny, specklike capsule leaf galls, brown when matured. Chadwick '08, p. 127
Acarid. Eriophyes sp.

Small pouch gall on under side of leaf of A. arbutifolia. Pl. 16, fig. 4. Thompson '15, p. 82
Acarid. Eriophyes sp.

Amelanchier (June berry)

Truncate leaf gall, greenish, tapering, red-lipped, length 5 mm. Fig. 135. Felt '08e, p. 388
Itonid. June berry lipped gall, Hormomyia canadensis Felt

Flattened, white, pouch gall on leaf, the margin denticulate, length 3 to 4 mm. Felt '11j, p. 453

Itonid. Toothed purse gall, *Cecidomyia* sp.

Oval, yellowish vein gall, length 1 to 1.5 cm. Fig. 136. Felt '11k, p. 558

Itonid. *Itonida canadensis* Felt

Leaf fold containing white larvae. Felt '11j, p. 453

Itonid. *Cecidomyia* sp.

A dimple similar to a phrygian cap with the tip rolled down on the upper side of the leaf, rarely below. Chadwick '08, p. 126

Acarid. *Eriophyes* sp.

Small, globose, dark brown, pocket leaf galls, singly or in clusters, on the upper surface; beneath pubescent and protuberant, diameter 2 mm, on A. *rotundifolia*. Chadwick '08, p. 126

Acarid. *Eriophyes* sp.

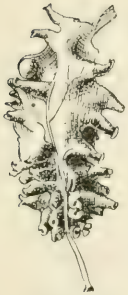

Fig. 135. June berry lipped gall, *Hormomyia canadensis* Felt. Badly infested leaf. (Original)

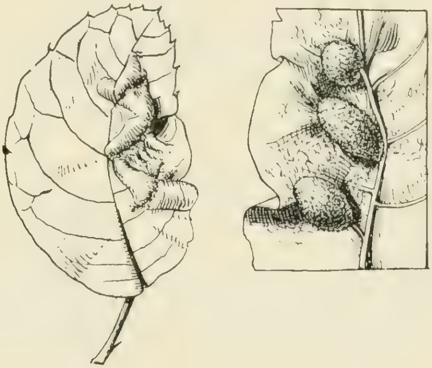

Fig. 136. *Itonida canadensis* Felt. Upper and lower surface, the latter enlarged. (Original)

Sorbus (mountain ash)

Rudimentary or infertile seeds. Crosby '09, p. 369

Hym. *Syntomaspis druparum* Boh.

Rudimentary or infertile seeds. Crosby '09, p. 375

Hym. *Megastigmus brevicaudis* Ratz.

Blister leaf gall. Parrott et al. '06, p. 298

Acarid. Pear blister mite, *Eriophyes pyri* Pgst.

Light brown or whitish erineum on the under surface of the leaf. Chadwick '08, p. 147

Acarid. *Eriophyes* sp.

Crataegus (White thorn)

Globose, constricted twig swellings, diameter 1.5 cm.

Coleop. Thorn limb borer, *Agrilus politus* Say

Irregularly oval, frequently fissured twig gall, length 3 to 4 cm, diameter 2.5 cm. Felt and Joutel '04, p. 62

Coleop. Thorn limb borer, Saperda fayi Bland.

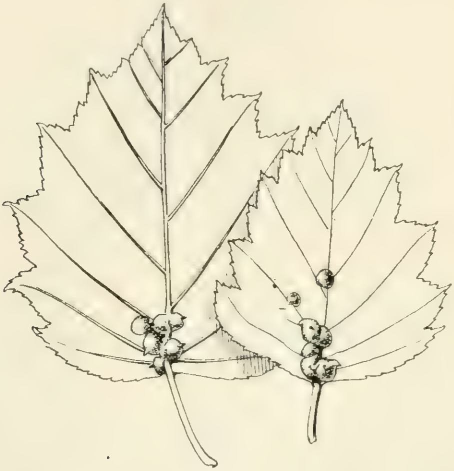

Fig. 137. Cecidomyia sp. on Crataegus, a2727. (Original)

Irregular twig swelling, resembling black knot of plum but with bright red spores, length 1–2 cm, on C. oxycantha.

Fungus. Cedar rust, Gymnosporangium globosum

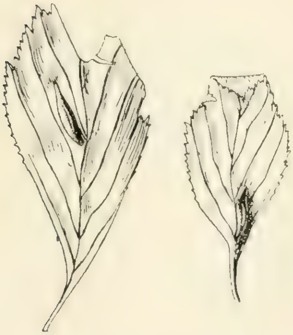

Fig. 138. Cecidomyia sp. on Crataegus, a1840. (Original)

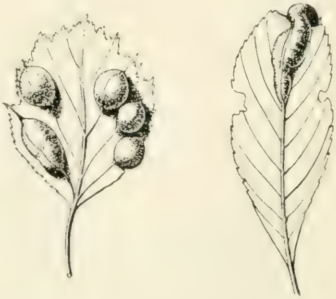

Fig. 139. Thorn vein gall, Lobopteromyia venae Felt, typical and confluent forms. (Original)

Cockscomb leaf gall, green and red, length 1 cm. Felt '07a, p. 160

Itonid. Thorn cockscomb gall, Hormomyia crataegifolia Felt

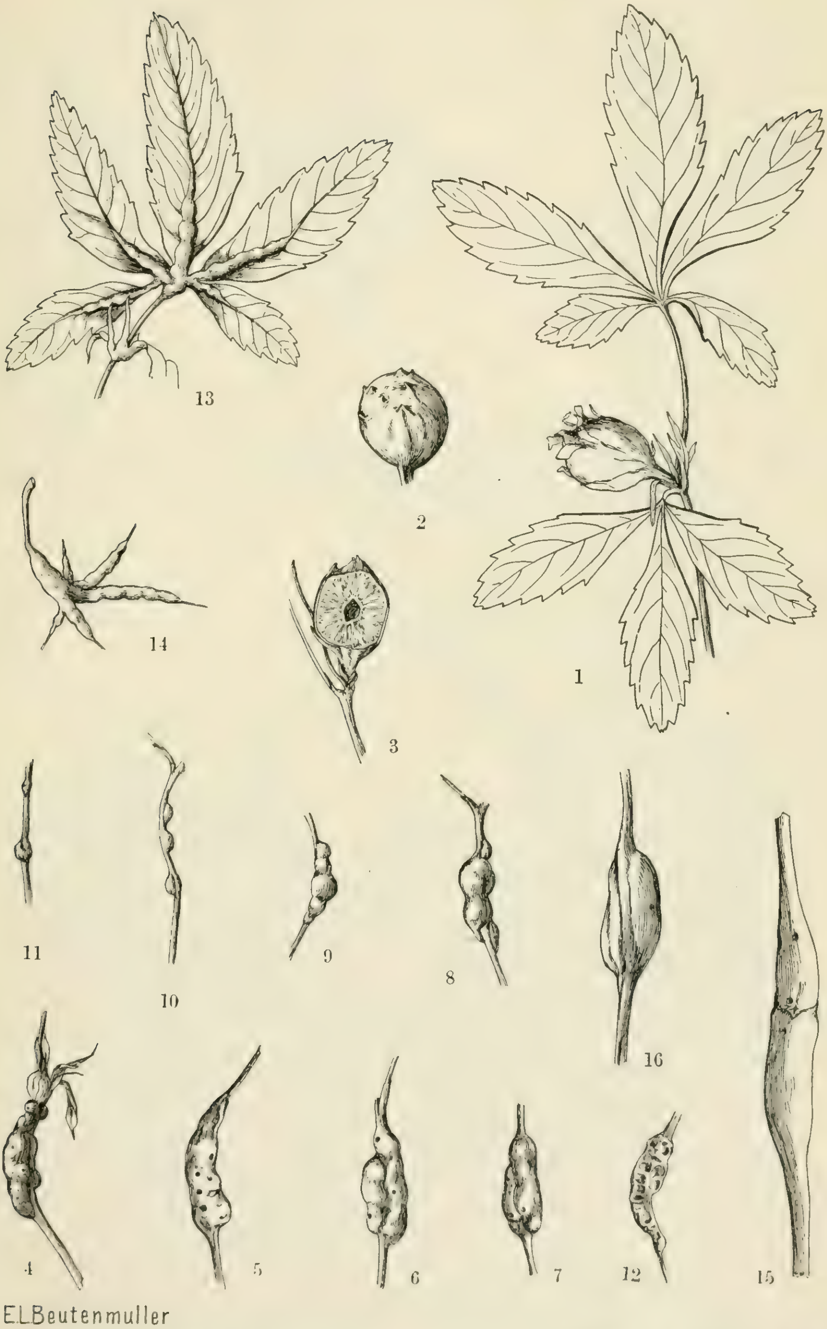

Fig. 140. 1–3. Cinquefoil axil gall, Gonaspis potentillae Bass. 4–14. Diastrophus niger Bass. 15, 16. Fusiform stem gall, D. fusiformans Ashm. (After Beutm., Am. Mus. Nat. Hist.)

Filamentous, subglobular vein gall, length 1 cm. Walsh '67, p. 266

Itonid. Tufted thorn gall, Cecidomyia bedeguar Walsh

Subglobose, greenish, sometimes confluent, frequently pointed, polythalamous vein gall, the under surface a variable brown or reddish, diameter about 3 mm. Fig. 137

Itonid. Cecidomyia sp. a2727

Fusiform, thickened vein fold gall, greenish or reddish, length 1 cm, diameter 2 mm. Fig. 138

Itonid. Cecidomyia sp. a1840

Stout, cup-shaped, fimbriate, unicellular leaf gall. Felt '08e, p. 422

Itonid. Fringed cup gall, Winnertzia hudsonici Felt

Cylindric, green, fimbriate, unicellular leaf gall, length 4 to 5 mm, height 1.5 mm. Felt '15e, p. 206

Itonid. Rhizomyia absobrina Felt

Reared from the same gall. Pl. 11, fig. 2, 3. Felt '08e, p. 408

Itonid. Lestodiplosis crataegifolia Felt

Marginal leaf roll, probably predaceous. Felt '08e, p. 409

Itonid. Lestodiplosis florida Felt

Oval, smooth, fleshy vein gall, length 5 to 8 mm. Fig. 139, pl. 10, fig. 9. Felt '14d, p. 120

Itonid. Thorn vein gall, Lobopteromyia venae Felt

Reared from the same gall. Felt '14d, p. 121

Itonid. Dicrodiplosis venitalis Felt

Purplish brown or green, blister leaf mine, diameter 8 mm. Felt '07e, p. 6

Itonid. Purple leaf blotch, Lasioptera excavata Felt

Reared from the same gall. Felt '15e, p. 208

Itonid. Rhizomyia hirta Felt

Spinulose, blackish gall on the upper surface of the leaf, on C. coccinea. Chadwick '08, p. 131

Acarid. Eriophyes sp.

Leaf curls, on C. crus-galli, C. tomentosa. Chadwick '08, p. 131

Acarid. Eriophyes sp.

Capsule gall, very small, green to brown and abundant on the leaves of C. punctata. Chadwick '08, p. 131

Acarid. Eriophyes sp.

Long, serpentine leaf folds, disposed radially, convex on the upper surface, green and red. Chadwick '08, p. 132

Acarid. Eriophyes sp.

Cotoneaster

Blister leaf galls. Parrott et al. '06, p. 298

Acarid. Pear blister mite, Eriophyes pyri Pgst.

Fragaria (strawberry)

Elongate, cylindrical, polythalamous petiole swelling, length 10 to 15 mm, diameter 3 mm. Cosens '15, p. 354

Cynipid. Cylindrical strawberry gall, Diastrophus fragariae Beutm.

Reniform petiole gall, length 8 to 21 mm. Felt '11j, p. 460

Itonid. Reniform strawberry gall, Cecidomyia reniformis Stebb.

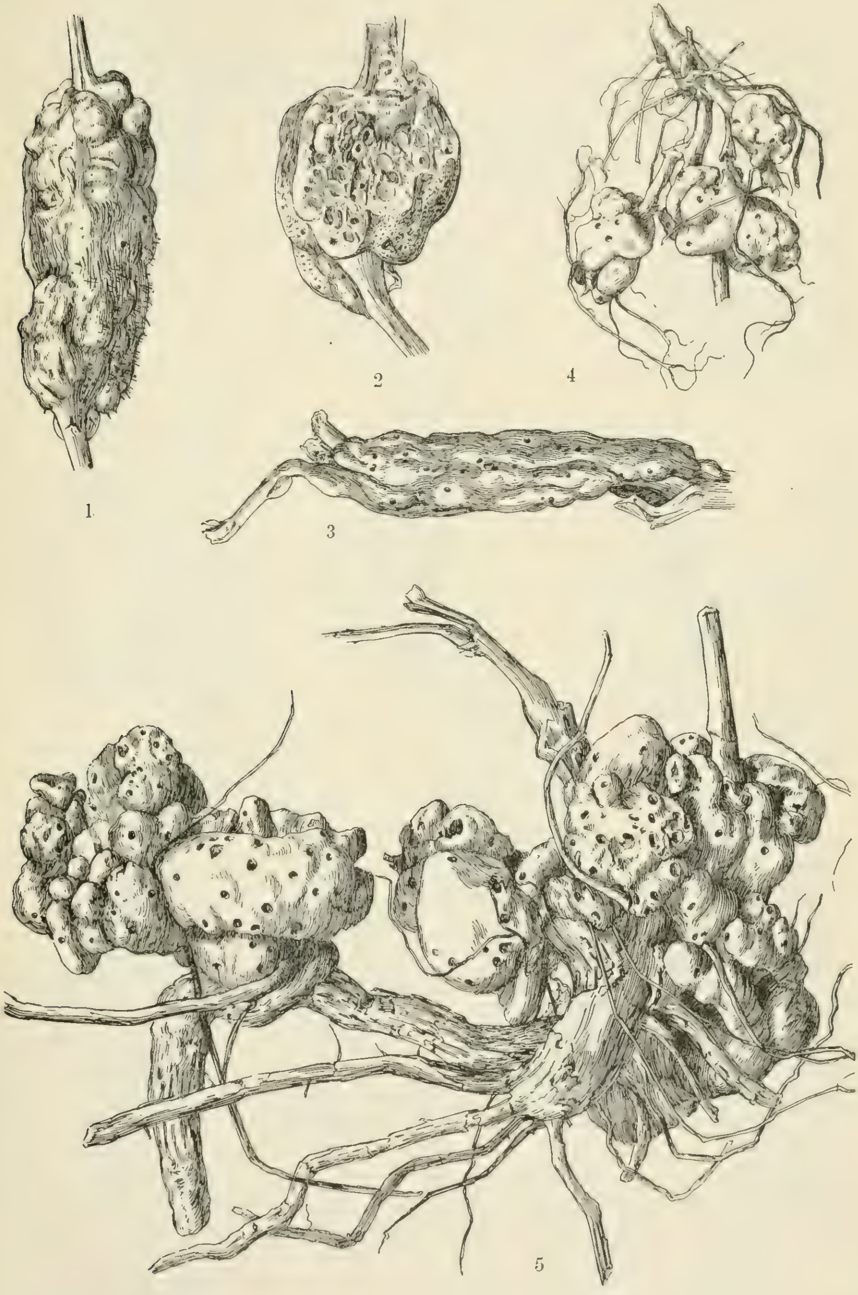

Fig. 141. Diastrophus galls. 1. D. turgidus Bass. 2, 3. D. kincaidi Gill. 4, 5. Blackberry root gall, D. radicum Bass. (After Beutm., Am. Mus. Nat. Hist.)

Potentilla (cinquefoil)

Globose bud enlargement containing an oval larval cell, green turning brown, diameter 8 to 12 mm. Fig. 140, 1–3. Beutm. '09, p. 144

Cynipid. Cinquefoil axil gall, Gonaspis potentillae Bass.

Much enlarged, internodal part of stem, apparently monothalamous. Stebb. '10, p. 37

Itonid. Internodal stem gall, Cecidomyia potentillaecaulis Stebb.

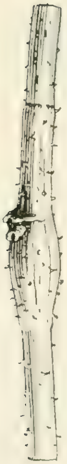

Fig. 142. Raspberry cane girdler, Oberea bimaculata O. S. (Original)

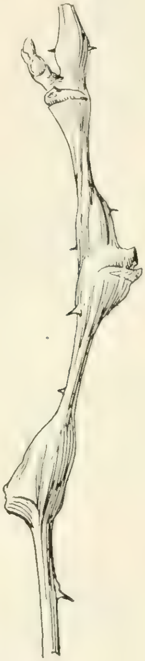

Fig. 143. Nodular stem gall, Lasioptera nodulosa Beutm. (Author's illustration)

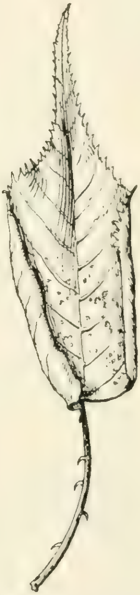

Fig. 144. Leaf roll of Camptoneuromyia rubifolia Felt. (Original)

Elongate, fusiform, polythalamous, stalk swelling, length 15 to 45 mm, diameter 5 to 8 mm. Fig. 140, 15, 16. Beutm. '09c, p. 141

Cynipid. Fusiform stem gall, Diastrophus fusiformans Ashm.

Elongate, oval, abrupt or blisterlike swellings on the stalk and midribs, monothalamous when single, polythalamous when coalescent, green turning brown, size variable, on P. canadensis. Fig. 140, 4–14. Beutm. '09c, p. 142

Cynipid. Diastrophus niger Bass.

A whitish erineum resembling minute tufts of grass, on both surfaces of the leaf. Chadwick '08, p. 138

Acarid. Eriophyes sp.

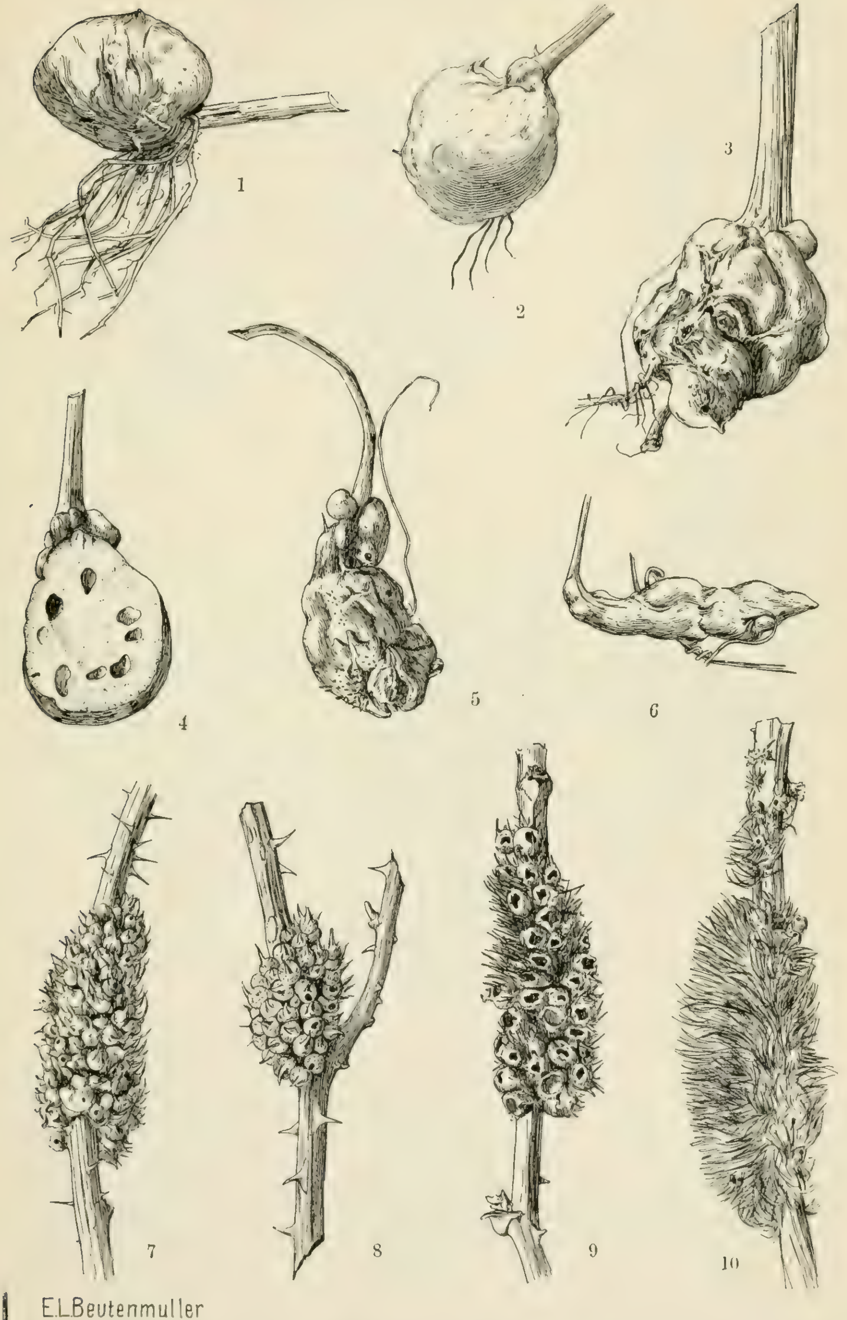

Fig. 145. Diastrophus galls. 1–5. Bassett's blackberry gall, D. bassetti Beutm. 6. Smilax stem gall, D. smilacis Ashm. 7–10. Blackberry seed gall, D. cuscutaeformis O. S. (After Beutm., Am. Mus. Nat. Hist.)

Rubus (bramble)

Irregular, rounded, brown, usually clustered galls on the root stalk, diameter 5 to 25 mm, on R. canadensis. Fig. 141, 4, 5. Beutm. '09c, p. 139

Cynipid. Blackberry root gall, Diastrophus radicum Bass.

Irregular, globose, greenish or yellowish green, tinged with red or sometimes entirely red swellings of the root or the stalk close to the ground, diameter 12 to 25 mm, on R. canadensis. Fig. 145, 1–5. Beutm. '09c, p. 139

Cynipid. Bassett's blackberry gall, Diastrophus bassetti Beutm.

Variable stem swelling with a characteristic girdling a little above and below, length 2 to 3 cm, on raspberry. Fig. 142. Sling. & Crosby '14, p. 326

Coleop. Raspberry cane girdler, Oberea bimaculata Oliv.

Irregular, ridged, cane gall, length 6 mm, diameter 2 cm, on blackberry

Coleop. Gouty gall beetle, Agrilus ruficollis Fabr.

Small, clustered, ovate, spined, seedlike, green or reddish, monothalamous, cane galls, on R. villosus, R. canadensis and R. cuneifolius. Fig. 145, 7–10. Beutm. '09c, p. 140

Cynipid. Blackberry seed gall, Diastrophus cuscutaeformis O. S.

Stem gall similar to that of D. turgidus, irregular and completely filled with oval, hard larval chambers, length 25 to 60 mm, diameter 12 to 25 mm, on R. nutkanus. Fig. 141, 2, 3. Beutm. '09c, p. 138

Cynipid. Diastrophus kincaidi Gill.

Abrupt, irregularly rounded or elongate stem swellings, sometimes with four or five deep, longitudinal furrows, variable in shape, dark green, turning reddish, length 25 to 75 mm, diameter 25 to 40 mm, on R. villosus. Fig. 146, 1, 2. Beutm. '09c, p. 136

Cynipid. Blackberry knot gall, Diastrophus nebulosus O. S.

Abrupt, elongate, soft, pithy, sometimes spined, irregular, stemmed swellings, length 25 to 75 mm, diameter 15 to 30 mm, on R. strigosus. Fig. 141, 1, 146, 3–9. Beutm. '09c, p. 137

Cynipid. Diastrophus turgidus Bass.

Irregular, subcortical stem gall, length 2 cm. Fig. 143. Beutm. '07c, p. 397

Itonid. Nodular stem gall, Lasioptera nodulosa Beutm.

A subglobular, unilateral branch enlargement, diameter 5 mm, the walls thin and the cavity large, possibly North American. Marcellia 5:101

Cynipid. Rhodites rubicola Kieff.

Reared from blossoms of R. ? villosus. Felt '15e, p. 138

Itonid. Blackberry blossom midge, Dasyneura rubiflorae Felt

Warty, pruinose leaf vein gall, length 1 to 3 cm. Osten Sacken '62, p. 204

Itonid. Mealy leaf gall, Lasioptera farinosa Beutm.

Subglobular, filamentous vein gall on R. nigrobaccus. Stebb. '10, p. 35

Itonid. Mossy vein gall, Cecidomyia muscosa Stebb.

Marginal leaf roll, length 4 to 6 cm. Fig. 144. Felt '08e, p. 34

Itonid. Camptoneuromyia rubifolia Felt

Agrimonia (agrimony)

Reared from florets. Felt '07e, p. 21

Itonid. Contarina agrimoniae Felt

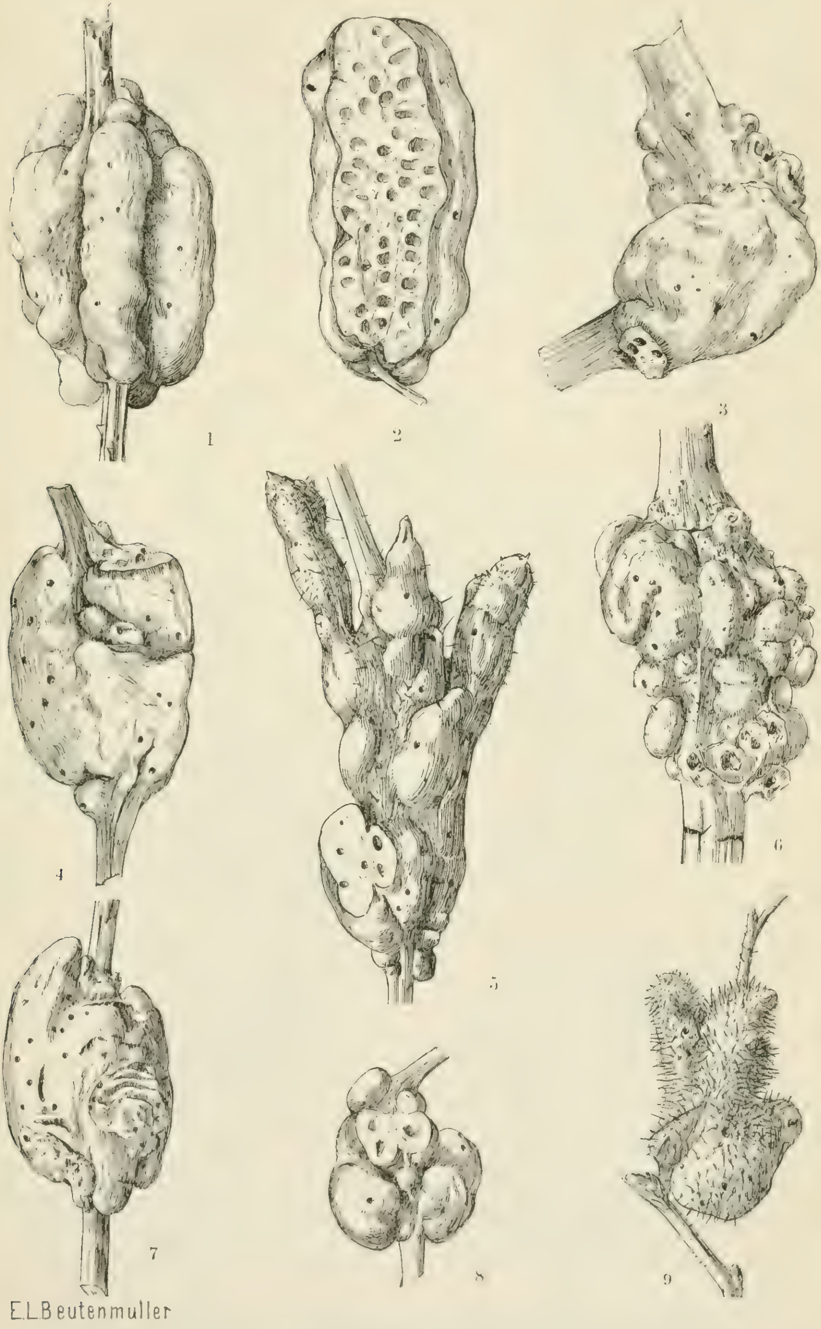

Fig. 146. Diastrophus galls. 1, 2. Blackberry knot gall, D. nebulosus O. S. 3–9. D. turgidus Bass. (After Beutm., Am. Mus. Nat. Hist.)

Rosa (rose)

Root galls

Roundish, reddish brown, variable or frequently tomato-shaped root gall, diameter 35 to 60 mm. Fig. 148, 7–8. Beutm. '07a, p. 648

Cynipid. Rose root gall, Rhodites radicum O. S.

Similar to R. radicum but with the top and sides deeply incised, giving a rosette effect. Fig. 148, 6. Beutm. '07a, p. 649

Cynipid. Rhodites utahensis Bass.

Globose, woody, root nodules, single, clustered or coalescent; diameter of nodules 4 to 6 mm, of clusters 10 to 30 mm, on sweetbrier. Fig. 150, 2–4. Beutm. '07a, p. 647

Cynipid. Rhodites fulgens Gill

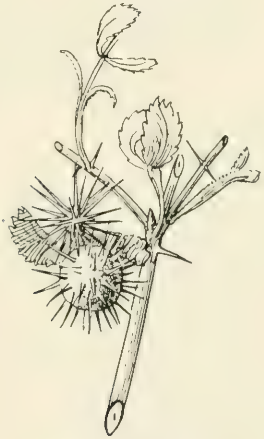

Fig. 147. Spiny rose gall, Rhodites bicolor Harr. (Original)

Twig galls

Irregularly oval, filamentaceous, polythalamous twig galls composed of numerous hard cells, diameter 25 to 50 mm. Fig. 149, 5, 6. Beutm. '07a, p. 633

Cynipid. Mossy rose gall or rose bedeguar, Rhodites rosae Linn.

Masses of confluent, spherical, unilocular, spined cells or an irregular twig gall ranging in size from a walnut to an apple, differing from the preceding by the absence of mossy filaments; young galls clothed with short, erect, fine spines, later becoming smooth. Beutm. '14, p. 87

Cynipid. Rhodites mayri Schl.

Globose, irregularly rounded, polythalamous, somewhat elongated, green twig swelling covered with numerous aborted leaflets and filaments, giving it a mossy appearance; diameter 20 to 35 mm. Beutm. '14, p. 88

Cynipid. Rhodites californicus Beutm.

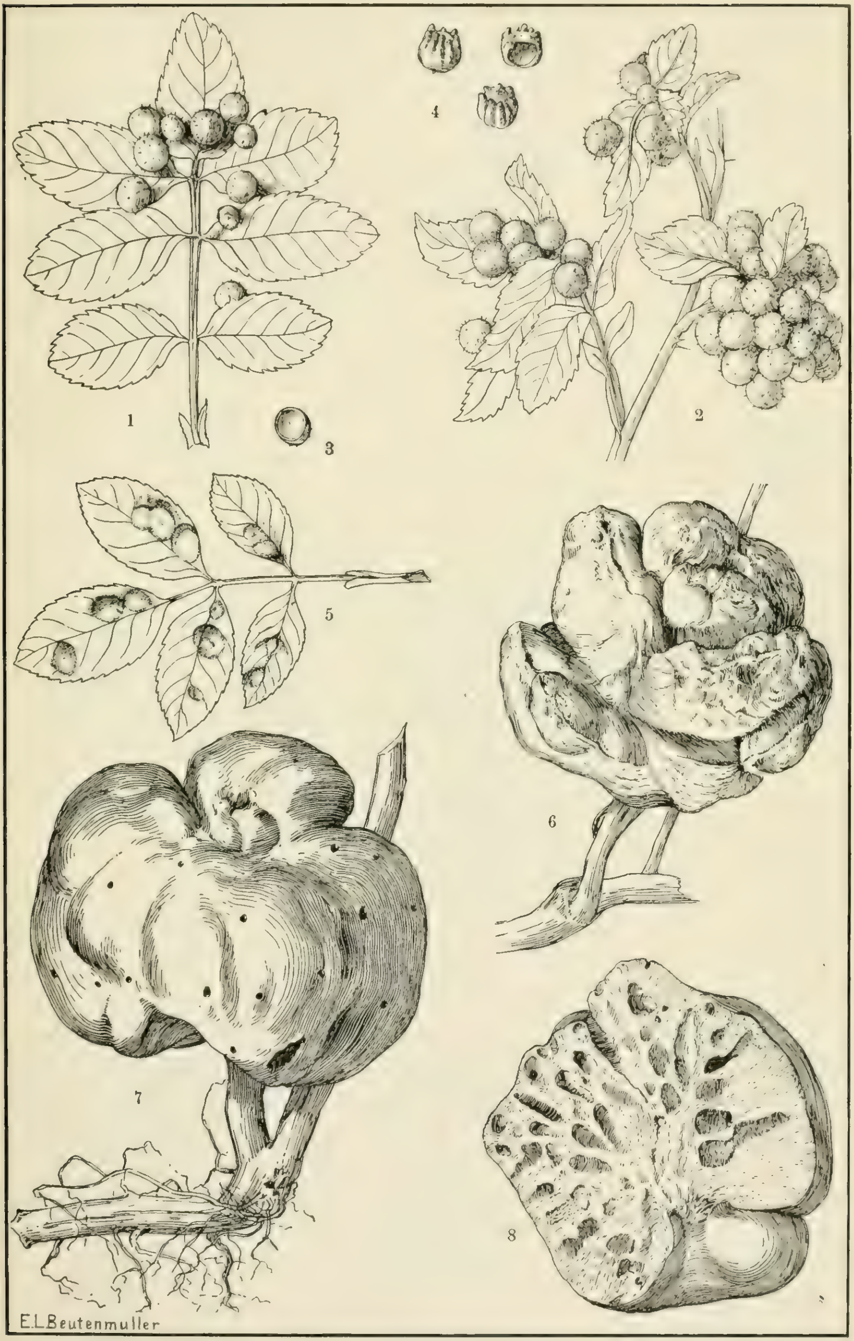

Fig. 148. Rose or Rhodites galls. 1–3. R. nebulosus Bass. 4. Regal rose gall, R. gracilis Ashm. 5. Rose blister gall, R. rosaefolii Ckll. 6. R. utahensis Bass. 7–8. Rose root gall, R. radicum O. S. (After Beutm., Am. Mus. Nat. Hist.)

Globular, yellowish green or reddish, prickly twig galls, diameter 5 to 15 mm, usually in clusters of 2 to 10. Fig. 147, 149, 1–4. Beutm. '07a, p. 633
Cynipid. Spiny rose gall, Rhodites bicolor Harr.

Spherical, smooth, reddish yellow, varying to pink and dull purplish twig galls, diameter 25 to 38 mm, on wild rose. Fig. 151, 8–10. Cockerell '88, p. 60
Cynipid. Rhodites tuberculator Ckll.

Globose, densely spined, reddish brown twig gall, diameter 20 to 32 mm. Fig. 150, 1, 151, 11–12. Beutm. '07a, p. 642
Cynipid. Many spined twig gall, Rhodites multispinosus Gill.

Globose, reddish, stem swellings, frequently in series, length 12 mm. Fig. 152, 1. Beutm. '07a, p. 635
Cynipid. Knotty rose gall, Rhodites vernus O. S.

Globose, elongate, soft, polythalamous enlargements, length 4 to 12 mm, diameter 4 to 9 mm. Fig. 150, 10–12. Beutm. '07a, p. 643
Cynipid. Rhodites fusiformans Ashm.

Subglobose, irregular, dense, corky twig enlargements, usually close to the stem from which the shoot arises, the surface rusty and finely wrinkled; diameter 12 to 21 mm. Fig. 151, 1–4, 13. Beutm. '07a, p. 640
Cynipid. Rhodites arefactus Gill.

Subglobose, budlike, hard, polythalamous enlargements on a short stem; diameter 15 to 25 mm. Fig. 151, 5–7. Beutm. '07a, p. 640
Cynipid. Rhodites tumidus Bass.

Rounded or reniform, smooth, green or brown, polythalamous enlargements arising abruptly from the branch; length 35 mm, diameter 10 to 22 mm. Fig. 152, 2–6. Beutm. '07a, p. 638
Cynipid. Globular rose gall, Rhodites globuloides Beutm.

Rounded or elongate, smooth, with two or more transverse ridges, polythalamous, abrupt twig swellings, length 14 to 18 mm, diameter 11 to 15 mm. Fig. 152, 7, 8. Beutm. '07a, p. 638
Cynipid. Rhodites neglectus Gill.

Subfusiform, elongate, smooth or prickly twig swellings, length 14 to 54 mm, diameter 7 to 18 mm. Fig. 152, 9–14. Beutm. '07a, p. 637
Cynipid. Long rose gall, Rhodites dichlocerus Harr.

Elongate, slight, monothalamous twig swelling, length 8 to 12 mm, diameter 2 to 4 mm. Beutm. '09f, p. 247
Cynipid. Nodular twig gall, Rhodites nodulosus Beutm.

Globose, elongate or reniform, woody twig or leaf galls covered with a white powder, diameter 4 to 15 mm. Fig. 149, 7–10. Beutm. '07a, p. 634
Cynipid. Mealy rose gall, Rhodites ignotus O. S.

Similar to the preceding, brown or reddish but without the white powder, diameter 5 to 15 mm. Fig. 150, 5–9. Beutm. '07a, p. 635
Cynipid. Rhodites variabilis Bass.

Leaf galls

Lentil-shaped, monothalamous swellings showing on both leaf surfaces, transverse diameter 2.5 to 3 mm, vertical diameter 1 to 2 mm. Fig. 148, 5, 150, 13. Beutm. '07a, p. 646
Cynipid. Rose blister gall, Rhodites rosaefolii Ckll.

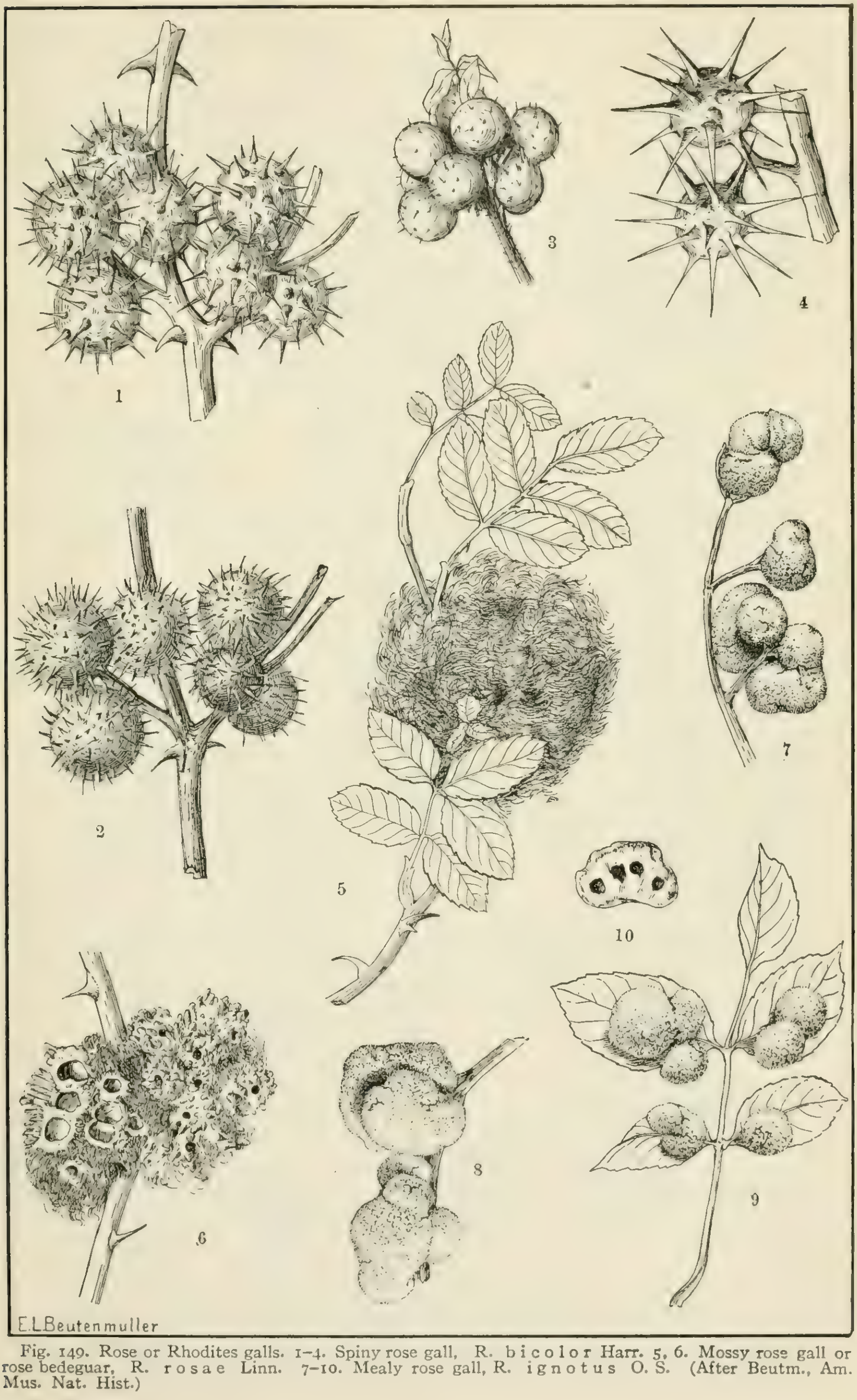

Fig. 149. Rose or Rhodites galls. 1–4. Spiny rose gall, R. bicolor Harr. 5, 6. Mossy rose gall or rose bedeguar, R. rosae Linn. 7–10. Mealy rose gall, R. ignotus O. S. (After Beutm., Am. Mus. Nat. Hist.)

Globular, hollow, weakly-spinose, small, green leaf galls, diameter 5 to 6 mm; occur singly or in clusters. Fig. 148, 1–3. Beutm. '07a, p. 644

Cynipid. Rhodites nebulosus Bass.

Gall resembling the preceding, on wild rose. Beutm. '14, p. 89

Cynipid. Rhodites pustulatoides Beutm.

Small gall, possibly identical with R. nebulosus. Beutm. '07a, p. 644

Cynipid. Rhodites politus Ashm.

Irregularly obconical leaf gall with short, obtuse processes around the edges, diameter 3 to 4 mm, on Rosa blanda. Fig. 148, 4, 153. Felt '15e, p. 48

Cynipid. Regal rose gall, Rhodites gracilis Ashm.

Leaf gall resembling a miniature simlin squash with numerous long, slender, bractlike processes, length 4 to 5 mm, diameter of top 4 mm, on wild rose. Beutm. '13a, p. 93

Cynipid. Tufted rose gall, Rhodites weldi Beutm.

Globose, monothalamous leaf galls with a subapical circle of slender, fleshy appendages 2 to 3 mm long, diameter of gall 5 mm, near R. politus. Wash. Trotter '11, p. 104

Cynipid. Rhodites sp.

Subglobose, longitudinally ribbed leaf gall, the poles broadly truncate, green or reddish, diameter 3.5 mm, near R. gracilis. Wash. Trotter '11, p. 103

Cynipid. Rhodites silvestrii Trott.

Bud galls

Rose buds and developing leaves inhabited and sometimes blasted by yellowish larvae. Felt '15e, p. 130

Itonid. Rose bud midge, Dasyneura rhodophaga Coq.

Reared from similar rose buds and undoubtedly preying on aphids. Coq. '00, p. 46

Itonid. Rose aphid midge, Aphidoletes rosivora Coq.

Curled or folded terminal leaves. Pl. 10, fig. 1. Felt '15e, p. 166

Itonid. Rose leaf midge, Dasyneura? rosarum Hardy

Apical, loose bud or rosette gall, length 2 to 2.5 cm. Fig. 154. Felt '15e, p. 97

Itonid. Rosette midge, Rhabdophaga rosacea Felt

Globose or fusiform, irregularly enlarged terminal or lateral buds with a leafy crest around and more or less concealing the acuminate apex; internally a large, irregular cavity, length 5 to 15 mm, diameter 4 to 7 mm. Wash. Trotter '11, p. 104

Cynipid. Rose bud wasp, Rhodites sp.

Reared from infertile seeds. Crosby '09, p. 377

Hym. Rose seed wasp, Megastigmus aculeatus Swed.

Amygdalus (peach)

A silver sheen on the leaf of peach. Chadwick '08, p. 127

Acarid. Phyllocoptes cornutus Bnks.

Prunus (plum, cherry)

Irregular, subcortical, black twig swelling, length 1–3 cm, on plum

Fungus. Black knot, Plowrightia morbosa

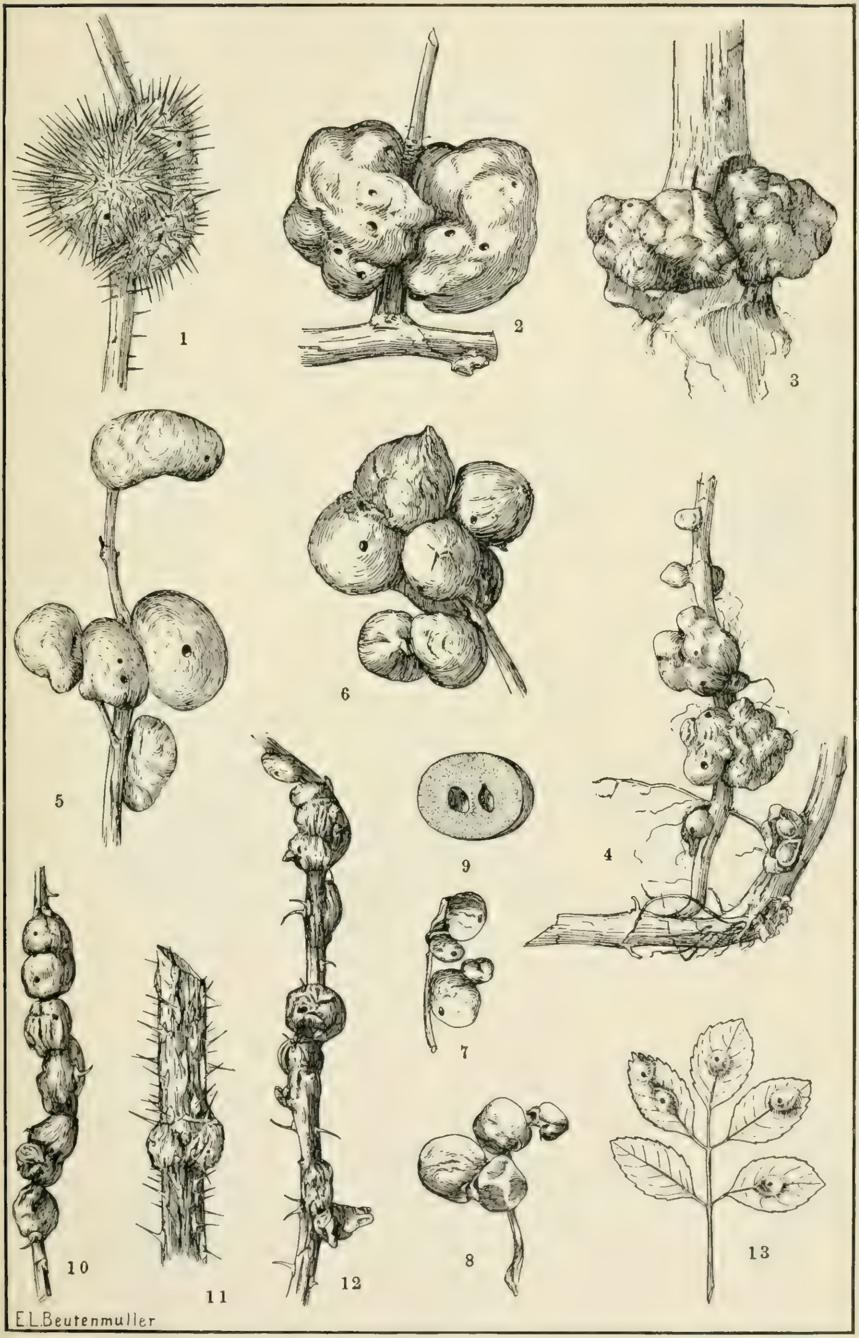

Fig. 150. Rose or Rhodites galls. 1. Many spined twig gall, R. multispinosus Gill. 2–4. R. fulgens Gill. 5–9. R. variabilis Bass. 10–12. R. fusiformans Ashm. 13. Rose blister gall, R. rosaefolii Ckll. (After Beutm., Am. Mus. Nat. Hist.)

Greenish, curled, irregularly swollen pouch gall, length 5 mm, diameter 2 to 3 mm, on wild plum, P. americana Fig. 155

Acarid. Eriophyes sp. a2535

A very long, slender, green or whitish pouch gall on the under side of the leaf, on wild plum, P. americana. Chadwick '08, p. 138

Acarid. Eriophyes sp.

Pocket leaf galls, elongate and purselike, tomentose below, rounded and hairy above, on Chickasaw plum, P. angustifolia. Chadwick '08, p. 139

Acarid. Eriophyes sp.

Tubular growth encircling the base of buds and shoots of plum, P. domestica. Chadwick '08, p. 139

Acarid. Eriophyes phloeocoptes Nal.

Long, pedunculated, black, pouch galls on the upper side of the leaf, on beach plum, P. maritima. Chadwick '08, p. 139

Acarid. Eriophyes sp.

Smaller and shorter-stalked, green, pouch gall on the upper side of the leaves of beach plum, P. maritima. Chadwick '08, p. 139

Acarid. Eriophyes sp.

Small, yellow, pocket galls crowded on the upper side of the leaf and around some leaf stalks of plum. Chadwick '08, p. 141

Acarid. Eriophyes sp.

Swollen, deformed fruit of chokecherry, P. virginiana. Pl. 9, fig. 6. Felt '06a, p. 130

Itonid. Chokecherry midge, Contarinia virginianiae Felt

Reared from the same fruit, probably inquiline. Felt '07a, p. 143

Itonid. Parallelodiplosis acernea Felt

Reared from the same fruit, probably inquiline. Felt '11k, p. 558

Itonid. Itonida canadensis Felt

Reared from the same fruit, probably predaceous. Felt '11j, p. 466

Itonid. Lestodiplosis sp.

Reared from the same fruit, probably inquiline. Felt '15e, p. 206

Itonid. Rhizomyia absobrina Felt

Probably reared from the same fruit, presumably inquiline. Felt '11k, p. 554

Itonid. Cecidomyia cerasiphila Felt

Reared from the same fruit, probably predaceous. Felt '07e, p. 20

Itonid. Arthrocnodax apiphila Felt

Swollen, deformed fruit, on wild cherry, P. ? melanocarpa. Felt '11k, p. 480

Itonid. Dasyneura pergandei Felt

Elliptical, polythalamous gall on the raceme axis, length 27 mm, on choke cherry, P. virginiana. Pl. 7, fig. 5. Felt '11j, p. 466

Itonid. Cecidomyia racemi Stebb.

Irregular, terminal shoot and bud gall, diameter 1.5 cm, on wild black cherry, P. serotina. Pl. 7, fig. 6. Osten Sacken '71, p. 346

Itonid. Wild cherry bud gall, Cecidomyia serotinae O. S.

Variable, oval or fusiform twig galls on wild black cherry, P. serotina. Felt '08e, p. 407

Itonid. Cecidomyia sp.

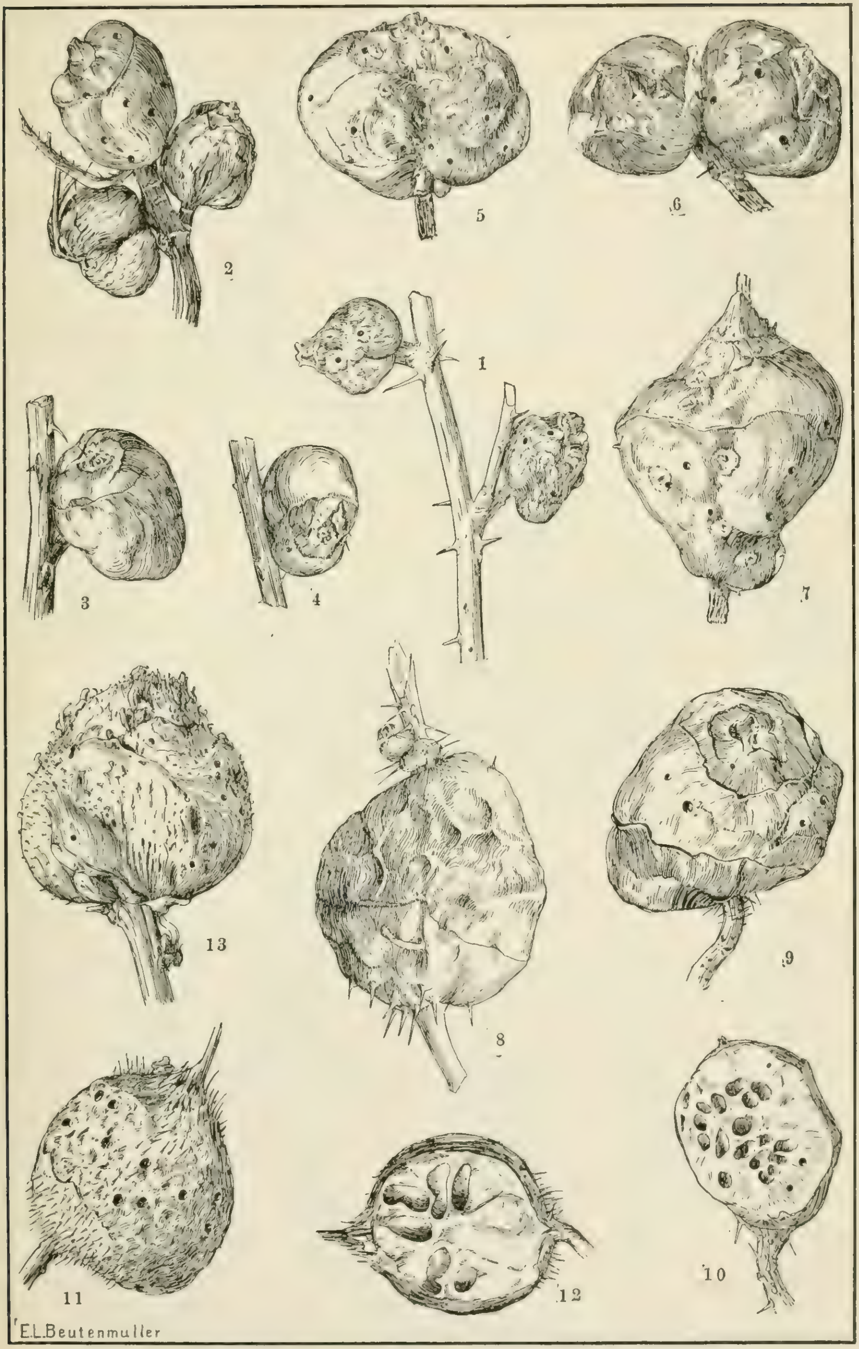

Fig. 151. Rose or Rhodites galls. 1–4, 13. R. arefactus Gill. 5–7. R. tumidus Bass. 8–10. R. tuberculator Ckll. 11–12. Many spined twig gall, R. multispinosus Gill (After Beutm., Am. Mus. Nat. Hist.)

Conical swelling at base of leaf stalk, length 1.5 cm, diameter 8 mm. Felt '15e, p. 219

Itonid. Cecidomyia sp.

Reared from same gall, probably predaceous. Felt '11j, p. 466

Itonid. Lestodiplosis cerasi Felt

Irregular, thickened, folded, nearly full-sized choke cherry leaf, P. virginiana. Pl. 11, fig. 4. Felt '07e, p. 21

Itonid. Mycodiplosis cerasifolia Felt

Stemmed, fusiform, green or red leaf galls on upper surface, length 1 cm, diameter 4 to 5 mm, on wild black cherry, P. serotina. Fig. 156, 157, pl. 16, fig. 2. Beutm. '04, p. 38

Acarid. Wild cherry pouch gall, Eriophyes padi Nal.

Pocket gall, shorter and more densely crowded than the preceding, on wild black cherry, P. serotina. Chadwick '08, p. 140

Acarid. Eriophyes sp.

Greenish or reddish pouch gall on the upper surface of the leaf of choke cherry P. virginiana. Chadwick '08, p. 140

Acarid. Eriophyes sp.

Reddish, slender, pouch galls, somewhat irregular and pubescent, on pin cherry leaves, P. pennsylvanica. Chadwick '08, p. 139

Acarid. Eriophyes sp.

Adenostoma

Reared from apparently unmodified seeds. Felt '16f, p. 177

Itonid. Asphondylia adenostoma Felt

Leguminosae (pulse family)

Prosopsis (mesquite)

Aborted fruit. Ckll. '98, p. 329. Felt '16d, p. 149

Itonid. Asphondylia prosopidis Ckll.

Fusiform bud gall. Felt '11j, p. 466

Itonid. Cecidomyia sp.

Gleditsia (honey locust)

Twig gall undescribed. Felt '11j, p. 461

Itonid. Neolasioptera sp.

Orange larvae in folded leaflets. Pl. 9, fig. 8. Felt '15e, p. 163

Itonid. Honey locust pod gall, Dasyneura gleditschiae O. S.

Cassia (wild sensitive plant)

Irregular stem gall, length 3 cm, diameter 5 or 6 mm. Felt '09e, p. 287

Itonid. Lasioptera cassiae Felt

Thermopsis montana

Folded, thickened, terminal leaf pods

Itonid. Cecidomyia sp.

Crotalaria (rattle box)

Fusiform stem swelling. Felt '11j, p. 459

Itonid. Cecidomyia crotalariae Stebb.

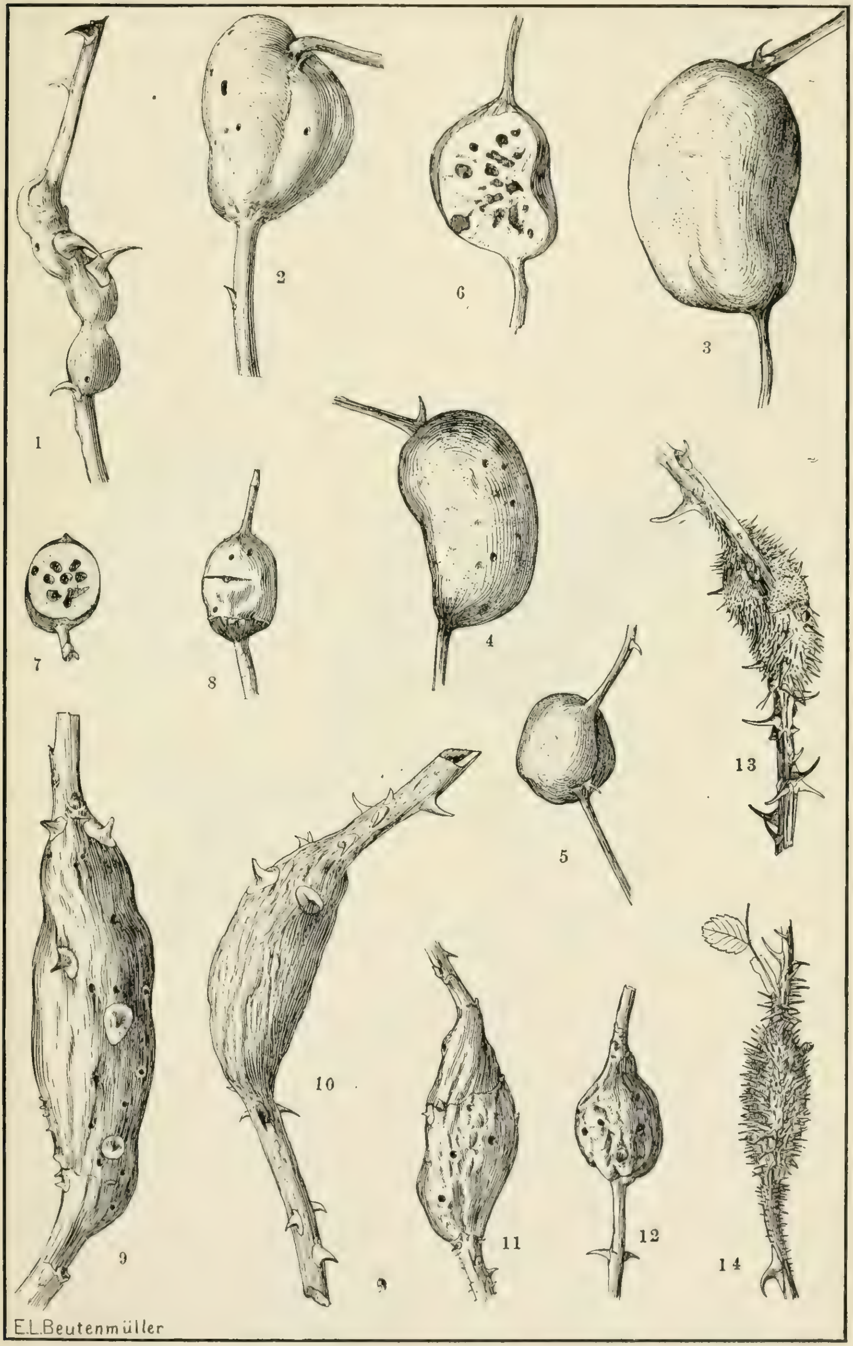

Fig. 152. Rose or Rhodites galls. 1. Knotty rose gall, R. vernus O. S. 2–6. Globular rose gall, R. globuloides Beutm. 7, 8. R. neglectus Gill. 9–14. Long rose gall, R. dichlocerus Harr.; 9–12. smooth; 13, 14. spiny types. (After Beutm., Am. Mus. Nat. Hist.)

Genista (woad-waxen)

Folded apical leaflets. Felt '11j, p. 461
Itonid. ? Dasyneura genistamtorquens Kieff.

Lupinus (lupine)

Irregularly fusiform stem galls, light green when fresh, fleshy, firm, polythalamous, the interior fibrous; length 1.5 to 2.5 cm, diameter 1 to 1.5 cm, on L. propinquus. Fig. 158. Felt '16g, p. 413
Itonid. Dasyneura lupini Felt

Elongate stem swelling
Itonid. Cecidomyia sp.

Reared from undescribed gall. Felt '08e, p. 326
Itonid. Lasioptera lupini Felt

Folded leaflets. Felt '15e, p. 143
Itonid. Clover leaf midge, Dasyneura trifolii Loew

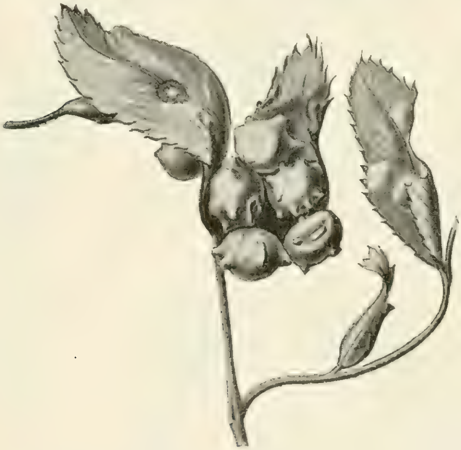

Fig. 153. Regal rose gall, Rhodites gracilis Ashm. (Author's illustration)

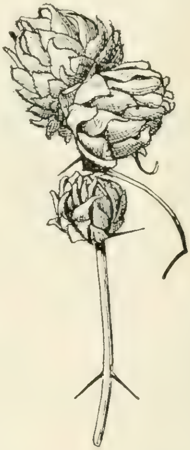

Fig. 154. Rosette midge, Rhabdophaga rosacea Felt. (Original)

Trifolium (clover)

Yellowish larvae in the flower heads of red clover, P. pratense. Felt '15e, p. 172
Itonid. Clover seed midge, Dasyneura leguminicola Lint.

Folded, variably discolored with reddish and yellowish, white clover leaves, T. repens. Felt '15e, p. 143
Itonid. Clover leaf midge, Dasyneura trifolii Loew

Medicago (alfalfa)

Aborted seed pods. Felt '11j, p. 463
Itonid. Asphondylia websteri Felt

Reared from seeds, probably predaceous upon Asphondylia
Itonid. Lestodiplosis sp. a2705

Robinia (locust)

Irregular, fusiform twig swellings, diameter 7 to 8 mm, length 2 mm. Pl. 4, fig. 7. Felt '06b, p. 478

Lepid. Locust twig gall, Ecdytolopha insiticiana Zell.

Folded, young leaflets. Felt '15e, p. 163

Itonid. Locust midge, Dasyneura pseudacaciae Fitch

Rolled leaf margins. Felt '08e, p. 410

Itonid. Obolodiplosis robiniae Hald.

Desmodium (tick trefoil)

Bud gall, probably loose. Beutm. '07d, p. 306

Itonid. Hyperdiplosis meibomiifoliae Beutm.

Elongate, fusiform, clustered bud gall, length 8 to 22 mm. Beutm. '07c, p. 390

Itonid. Dasyneura meibomiae Beutm.

Irregular stem gall, length 1.8 cm. Fig. 159. Felt '07a, p. 106

Itonid. Lasioptera desmodii Felt

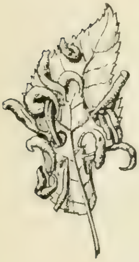

Fig. 155. Eriophyes gall on wild plum, a2535. (Original)

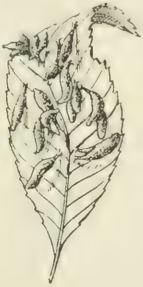

Fig. 156. Wild cherry pouch gall, Eriophyes padi Nal. A rather thick infestation. (Original)

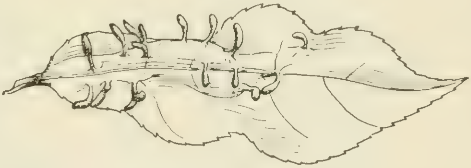

Fig. 157. Wild cherry pouch gall, Eriophyes padi Nal. A scattering infestation. (Original)

Polythalamous stem gall, length 2 cm. Fig. 160. Felt '07a, p. 155

Itonid. Neolasioptera hamata Felt

Lespedeza (bush clover)

Stem gall, length 5 mm, diameter 3 mm. Felt '11j, p. 463

Itonid. Cecidomyia sp.

Lathyrus maritimus (beach pea)

Rolled leaflets, length 1 to 2 cm. Felt '15e, p. 149

Itonid. Dasyneura maritima Felt

Amphicarpa (hog peanut)

Oval stem gall, length 1.5 cm, diameter 1 cm. Felt '11j, p. 453

Itonid. Lasioptera sp.

Geraniaceae (geranium family)

Geranium (Crane's-bill)

Colorless larvae on a blister enlargement, apparently fungivorous. Felt '11j, p. 461

Itonid. Cecidomyia sp.

Irregular, hairy, pinkish, pouch leaf gall, diameter 3 to 4 mm, on G. richardsonii. Fig. 161

Acarid. Eriophyes sp. a2529

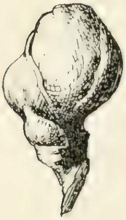

Fig. 158. Dasyneura lupini Felt. (Original)

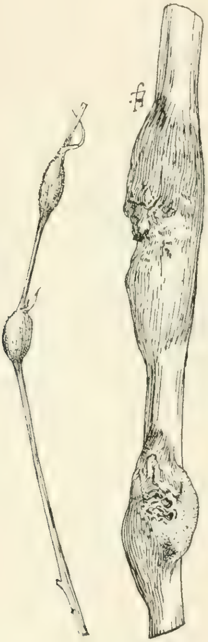

Fig. 159. Lasioptera desmodii Felt, two types of gall. (Author's illustration)

Zygophyllaceae (Caltrop family)

Covillea tridentata (creosote bush)

Gall undescribed. Felt '16d, p. 118

Itonid. Asphondylia auripila Felt

Globose, polythalamous, woody gall bearing a dense cluster of thin, linear filaments, diameter of gall 1 to 2 cm. Ariz. Fig. 162. Trotter '11, p. 132

Itonid. Asphondylia ?auripila Felt

Rutaceae (Rue family)

Citrus (orange, lemon)

Irregularly lobulate, woody bud galls on navel orange, length 1.5 cm, diameter 1 cm

Acarid. Eriophyes sp. a2856

Brownish, rust spots on the orange and curled leaves, lacking gloss, C. aurantium. Chadwick '08, p. 130

Acarid. Phyllocoptes oleivorus Ashm.

Whitened or silvery spots on the lemon rind and curled lemon leaf. Chadwick '08, p. 131

Acarid. Phyllocoptes oleivorus Ashm.

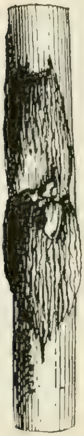

Fig. 160. Neolasioptera hamata Felt. (Original)

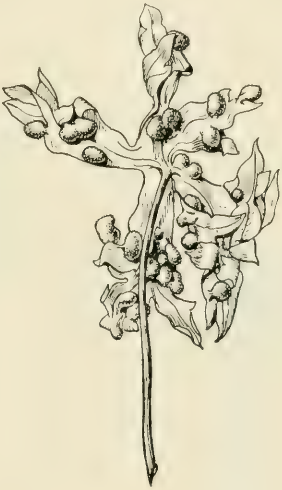

Fig. 161. Eriophyes on Geranium richardsonii. (Original)

Euphorbiaceae (spurge family)

Manihot (cassava)

Leaf galls. Felt '10c, p. 268

Itonid. Itonida manihot Felt

Leaf galls. Felt '12c, p. 144

Itonid. Lasiopteryx manihot Felt

Acalypha (three-seeded mercury)

Subglobular, reddish brown bud gall, diameter 4 mm. Felt '11j, p. 452

Itonid. Cecidomyia sp.

Phyllanthus distichus (Otaheite gooseberry)

Reared from fruit. Felt '16d, p. 123

Itonid. Asphondylia siccae Felt

Euphorbia (spurge)

Cylindrical fruit gall, length 5 mm, diameter 1 mm. Felt '11j, p. 460

Itonid. Spurge fruit gall, Cecidomyia sp.

A deformation of the leaves and flower buds of E. corollata. Chadwick '08, p. 132

Acarid. Eriophyes sp

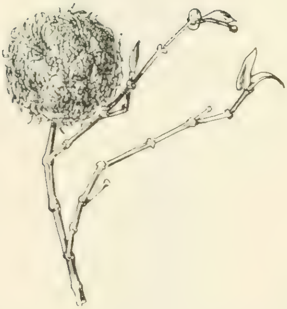

Fig. 162. Asphondylia ?auripila. Gall on creosote bush. (Original)

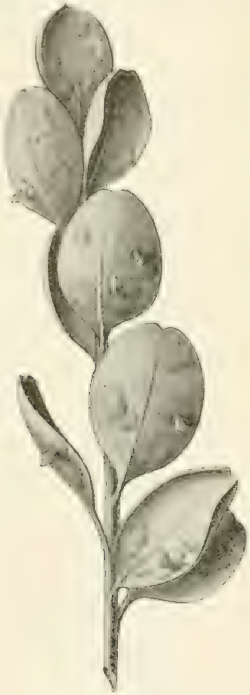

Fig. 163. Box leaf midge, Monarthropalpus buxi Lab. (Author's illustration)

Buxaceae (box family)

Buxus (box)

Oval, yellowish or brownish blister leaf galls, diameter 2 to 4 mm. Fig. 163. Felt '11j, p. 455

Itonid. Box leaf midge, Monarthropalpus buxi Lab.

Anacardiaceae (cashew family)

Mangifera (mango)

Reared from subcortical gall. Felt '09n, p. 299

Itonid. Mango bark midge, Asynapta mangiferae Felt

Reared from blister leaf gall. Felt '11g, p. 49

Itonid. Mango blister midge, Erosomyia mangiferae Felt

Rhus (sumac)

Subcortical stem gall. Felt '11j, p. 468
Itonid. Cecidomyia sp.

Reared from dead twigs. Felt '14b, p. 113
Itonid. Parallelodiplosis cinctipes Felt

Globose root galls on poison dogwood. Felt '15e, p. 146
Itonid. Sumac root gall, Dasyneura rhois Coq.

Infertile seeds. Crosby '09, p. 385
Hym. Eurytoma rhois Crosby

Stunted heads or curled leaves. Fig. 164, pl. 16, fig. 7. Felt '08e, p. 404
Acarid. Eriophyes sp.

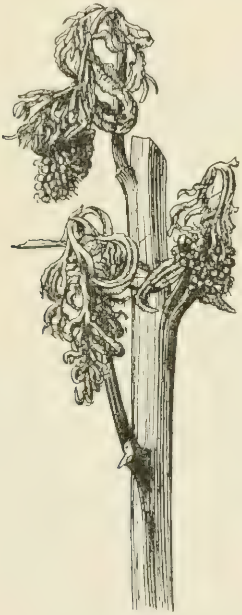

Fig. 164. Sumac leaves deformed by Eriophyes from which Arthrocnodax rhoina Felt was reared. (Original)

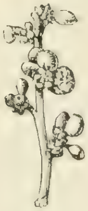

Fig. 165. Sumac bud gall, Asphondylia integrifoliae Felt. (Original)

Probably preying on a plant mite.
Itonid. Arthrocnodax rhoina Felt

Subglobular flower bud gall, diameter 3 mm. Fig. 165. Felt '16d, p. 126
Itonid. Sumac bud gall, Asphondylia integrifoliae Felt

An erineum on the leaves of R. radicans. Chadwick '08, p. 144
Acarid. Eriophyes sp.

Irregular, rounded, green to red or purple dimple galls, usually in granular heaps, on R. radicans. Pl. 16, fig. 6. Chadwick '08, p. 144
Acarid. Eriophyes sp.

Irregular, purplish, pouch or cylindric leaf galls with a diameter of 1 mm, the orifice with a white pubescence, on R. trilobata, Utah

Acarid. Eriophyes sp. a2760

Somewhat pear-shaped or round, reddish leaf galls occur in September, length 18 to 36 mm. Felt '06b, p. 647

Aphid. Red pouch gall, Pemphigus rhois Fitch

Aquifoliaceae (holly family)

Nemopanthus (mountain holly)

Oval bud gall, length 5 mm. Felt '16d, p. 142

Itonid. Asphondylia ilicoides Felt

Celastraceae (staff tree family)

Pachistima myrsinitis

Terminal leaves, folded, dark red. Felt '11j, p. 464

Itonid. Cecidomyia sp.

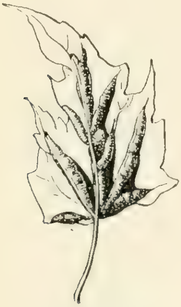

Fig. 166. Gouty vein midge, Dasyneura communis Felt. Gall on red maple. (Original)

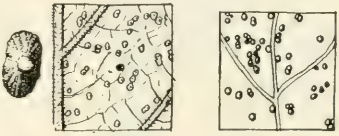

Fig. 167. Bladder maple gall, ? Phyllocoptes ?quadripes Shim., on red maple, showing lower and upper surface and one gall enlarged. (Original)

Celastrus (climbing bittersweet)

Irregular, subcortical gall on the root, length 2.5 cm, diameter 1 cm. Stebb. '10, p. 41

Itonid. Cecidomyia celastri Stebb.

Irregular, subcortical stem gall, probably identical with the preceding. Felt '11j, p. 457

Itonid. Cecidomyia sp.

Aceraceae (maple family)

Acer rubrum (red maple)

Whitish larvae under decaying bark. Felt '13h, p. 213

Itonid. Winnertzia aceris Felt

Same as above. Felt '13m, p. 205

Itonid. Miastor americana Felt

Same as above, predaceous. Felt '13h, p. 213
Itonid. Lestodiplosis sp.

Irregular twig swellings resembling those on willow and poplar made by Saperda concolor
Coleopt. Maple twig gall, Xylotrechus aceris Fisher

Irregular, oval, roughened branch swellings, length 10 to 15 cm, diameter 6 to 10 cm. Felt '06b, p. 56
Lepid. Maple sesian, Sesia acerni Clem.

Pustular areas in the smooth bark of red maple. Hodgk. '13, p. 420
Acarid. Anthocoptes transitionalis Hodgk.

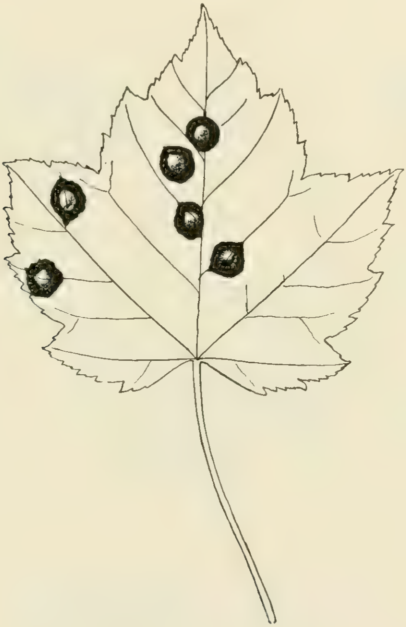

Fig. 168. Maple leaf spot, Cecidomyia ocellaris O. S. (Original)

Pouch vein galls, greenish or reddish, length 6 mm. Fig. 166. Felt '11, p. 478
Itonid. Gouty vein gall, Dasyneura communis Felt

Small bladder like leaf galls, diameter 2.5 mm. Fig. 167, Chadwick '08, p. 120
Acarid. Maple bladder gall, ? Phyllocoptes quadripes Shim.

Ocellate, yellow, red-margined blister leaf gall, diameter 3 to 4 mm. Fig. 168. Osten Sacken '62, p. 199
Itonid. Maple leaf spot, Cecidomyia ocellaris O. S.

Irregular leaf folds. Felt '15e, p. 94
Itonid. Rhabdophaga rileyana Felt

Distorted, rolled leaves bearing cocoons, possibly identical with the preceding. Felt '11j, p. 452
Itonid. Dasyneura sp

Reared from similar leaves, predaceous. Felt '11j, p. 452

Itonid. Lestodiplosis sp.

Slender, fusiform leaf galls, length 5 mm. Felt '06b, p. 650

Acarid. Maple spindle gall, Phyllocoptes aceris-crumena Riley

Red erineum on the upper leaf surface. Hodgk. '13, p. 423

Acarid. Phyllocoptes minutissimus Hodgk.

Pinkish erineum on the under leaf surface. Hodgk. '13, p. 421, 422, 424

Acarid. Eriophyes major Hodgk.
Eriophyes ornatus Hodgk.
Phyllocoptes quinquilobus Hodgk.

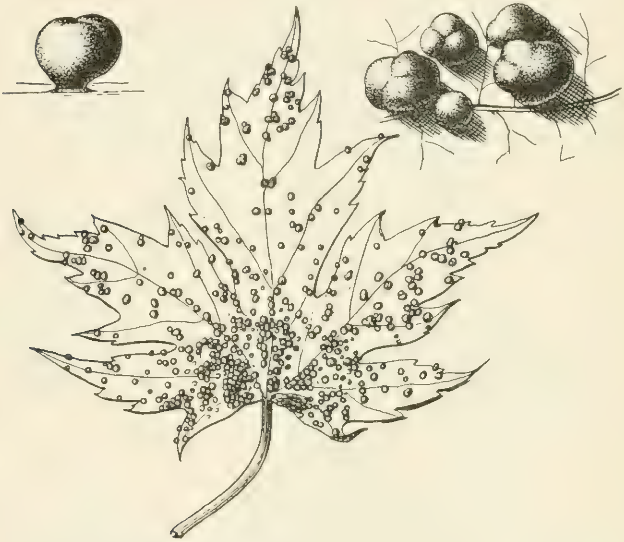

Fig. 169. Maple bladder gall, Phyllocoptes quadripes Shim., on soft maple. Several galls greatly enlarged. (Original)

Yellowish to deep brown erineum in large patches on under side of leaf. Chadwick '08, p. 120

Acarid. Eriophyes sp.

A whitish or brown erineum in elongated patches on the veins, on the upper side of the leaf. Chadwick '08, p. 120

Acarid. Eriophyes sp.

A whitish, frostlike erineum with small spots of rosy pink spreading broadly along the main veins, on the upper surface. Chadwick '08, p. 120

Acarid. Eriophyes sp.

Acer saccharinum (white or silver maple)

Free larvae on irregularly curved leaves. Felt '15e, p. 93

Itonid. Maple leaf midge, Rhabdophaga aceris Shim.

Slender, fusiform leaf galls, length 5 mm, sometimes very abundant, on the upper surface, also on sugar maple and white-barked maple. Felt '06b, p. 630

Acarid. Maple spindle gall, Phyllocoptes aceris-crumena Riley

Small, bladderlike greenish or reddish leaf galls, diameter 2.5 mm, very abundant, on the upper surface. Fig. 169, pl. 16, fig. 9. Felt '06b, p. 630

Acarid. Maple bladder gall, Phyllocoptes quadripes Shim.

Associated with the preceding. Hodgk. '13, p. 421

Acarid. Eriophyes confusus Hodgk.

A pale yellow to deep brown erineum on the under side of the leaf. Chadwick '08, p. 121

Acarid. Eriophyes sp.

Acer saccharum (sugar or rock maple)

Thickened vein galls, green to brownish, length 3 to 5 mm. Fig. 170. Felt '15e, p. 181

Itonid. ? Dasyneura communis Felt

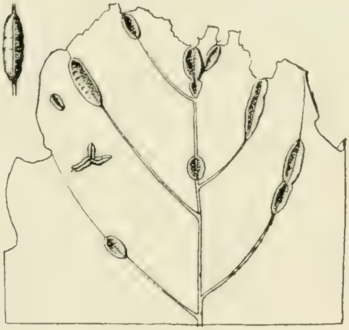

Fig. 170. Gouty vein midge, Dasyneura communis Felt. Gall presumably of this species on sugar maple, one gall closed, the others open. (Original)

Slender, fusiform leaf galls, length 5 mm, sometimes very abundant, on the upper surface, also on soft maple and white-barked maple. Felt '06b, p. 630

Acarid. Maple spindle gall, Phyllocoptes aceris-crumena Riley

Red erineum on the upper leaf surface. Hodgk. '13, p. 421, 422, 423 and 424

Acarid. Eriophyes elongatus Hodgk.
Eriophyes maculatus Hodgk.
Eriophyes regulus Hodgk.
Phyllocoptes constrictus Hodgk.
Phyllocoptes variabilis Hodgk.

Greenish erineum on the under leaf surface. Hodgk. '13, p. 421

Acarid. Eriophyes modestus Hodgk.

A white or whitish erineum in patches on the under side of the leaf. Chadwick '08, p. 121

Acarid. Eriophyes sp.

A rusty or brown erineum on the under leaf surface, forming patches along the veins. Chadwick '08, p. 122

Acarid. Eriophyes sp.

Acer platanoides (Norway maple)

Epidermal, hairy growths in vein axils, on the under leaf surface. Hodgk. '13, p. 423

Acarid. Phyllocoptes magnificus Hodgk.

Acer leucoderme (white-barked maple)

Slender, fusiform leaf galls, length 5 mm, sometimes very abundant on the upper surface, also on sugar maple and soft maple. Felt '06b, p. 630

Acarid. Maple spindle gall, Phyllocoptes aceris-crumena Riley

An erineum in scattered patches, mostly on the under surface of the leaf and slightly dimpled. Chadwick '08, p. 152

Acarid. Eriophyes sp.

Acer spicatum (mountain maple)

Whitish erineum on the upper leaf surface. Hodgk. '13, p. 422

Acarid. Eriophyes parallelus Hodgk.

Acer glabrum (dwarf maple)

A purple erineum in large patches at the tips of the lobes and on the upper side of the leaf, sometimes sprinkled over the under side. Chadwick '08, p. 119

Acarid. Eriophyes sp.

Acer species (maple)

Rolled leaf margin, the edges yellow, the center crimson. Felt '11j, p. 452

Itonid. Cecidomyia sp.

A black, velvety erineum in large, irregular patches on the leaf. Chadwick '08, p. 123

Acarid. Eriophyes sp.

Acer negundo (box elder)

Terminal bud galls with a diameter of 1 to 2 cm or greatly swollen, deformed leaflets, the thickened midrib forming a mass 3 cm long and 7 mm in diameter, the blade being almost aborted. Gill. '90a, p. 392

Acarid. Box elder bud gall, Cecidomyia negundinis Gill.

Variable, subglobose leaf gall, diameter about 2 mm. Felt '08c, p. 394

Itonid. Box elder leaf gall, Contarinia negundifolia Felt

A white erineum or shallow dimple on the under side of the leaf, sometimes involving entire leaves of young or basal shoots. Chadwick '08, p. 119

Acarid. Eriophyes sp.

Warty swellings on the leaves. Hodgk. '13, p. 422, 424
Acarid. Eriophyes negundi Hodgk.
Phyllocoptes splendidus Hodgk

Balsaminaceae (touch-me-not family)

Impatiens (balsam, jewel weed)

Globose, flower bud gall, length 1 cm. Pl. 7, fig. 4. Osten Sacken '62, p. 204
Itonid. Touch-me-not gall, Cecidomyia impatientis O. S.
Tumid, midrib fold, length 5 mm. Pl. 10, fig. 8. Felt '07a, p. 105
Itonid. Lasioptera impatientifolia Felt
Subglobular stem gall. Beutm. '08, p. 75
Itonid. Lasioptera fulva Beutm.
Enlarged stem infested with Æcidium impatientis. Felt '08e, p. 401
Itonid. Mycodiplosis impatientis Felt

Rhamnaceae (buckthorn family)

Ceanothus (red root)

Loose, terminal bud gall, length 2 cm, diameter 1.5 cm. Felt '16d, p. 135
Itonid. Redroot bud gall, Asphondylia ceanothi Felt
Thickened vein fold, sometimes confluent, light green, 5x3 mm
Itonid. Cecidomyia sp. a2818
Spindle-shaped stem enlargements, 10 to 15 mm long, 5 to 8 mm in diameter, sometimes on branches, occasionally aborting flower clusters.
Lepid. Red root stem gall, Stagmatophora ceanothiella Cosens

Vitaceae (vine family)

Psedera (Virginia creeper, woodbine)

Infertile seeds. Crosby '09, p. 382
Hym. Woodbine seed wasp, Prodecatoma phytophaga Crosby
Tumid, more or less irregular, sometimes winged midrib leaf gall, length 1 cm. Fig. 171. Felt '13h, p. 216
Itonid. Woodbine vein gall, Dasyneura parthenocissi Stebb.
A "nail gall" or pouch leaf gall tapering at both extremities. Chadwick '08, p. 127
Acarid. Eriophyes sp.
Irregular root gall, diameter 2 to 3 mm. Felt '11j, p. 466
Itonid. Woodbine root gall, Cecidomyia sp.

Vitis (grape)

Fruit and bud galls

Shriveled berries and enlarged seeds. Crosby '09, p. 380
Hym. Grape seed wasp, Evoxysoma vitis Saund.
Reared from grape seeds. Howard '95, p. 23
Hym. Decatomidea cooki How.
Reared from enlarged, sometimes reddish, striped blossom buds, diameter 2 to 3 mm. Felt '09f, p. 15
Itonid. Grape blossom midge, Contarinia johnsoni Sling.

Hard, nut-like, polythalamous bud gall, diameter 1.5 cm. Felt '16d, p. 109
Itonid. Grape apple gall, Schizomyia pomum Walsh & Riley

Possibly reared from the same gall. Felt '15e, p. 108
Itonid. Rhabdophaga hirticornis Felt

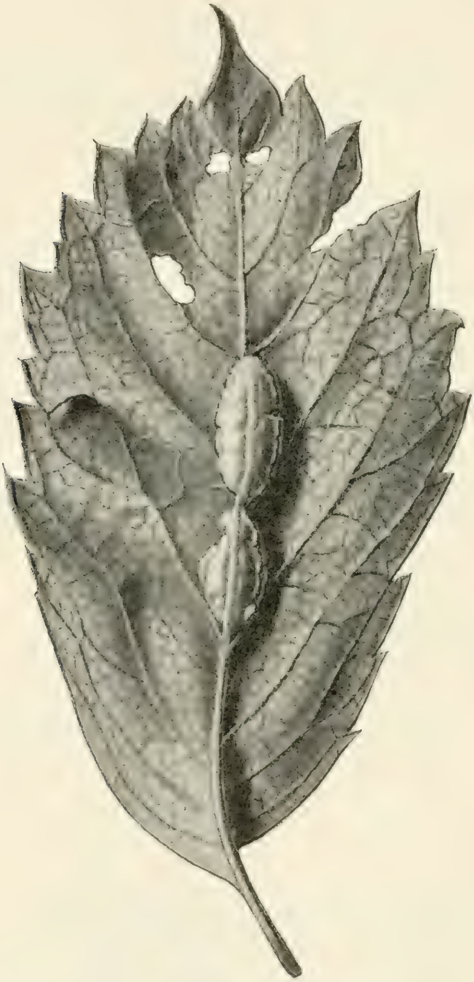

Fig. 171. Woodbine vein gall, Dasyneura parthenocissi Stebb. (Author's illustrati

Clustered, fusiform, woolly, pubescent bud galls, each 1 to 1.5 cm long. Pl. 13, fig. 6. Felt '16d, p. 107
Itonid. Grape filbert gall, Schizomyia coryloides Walsh & Riley

Leaf or tendril galls

Oval, petiole or tendril gall, length 2.5 cm, swelling mostly distant from the base. Felt, '16d, p. 113
Itonid. Schizomyia petiolicola Felt

Reared from similar gall. Fig. 172. Felt '08e, p. 328
Itonid. Asteromyia petiolicola Felt

Reared from similar gall. Felt '09e, p. 287
Itonid. Lasioptera riparia Felt

Reared from similar gall, swellings mostly basal. Felt' 07a, p. 153
Itonid. Neolasioptera vitinea Felt

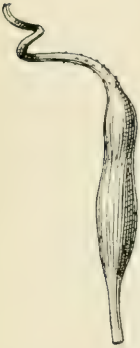

Fig. 172. Grape tendril gall, Asteromyia petiolicola Felt. (Original)

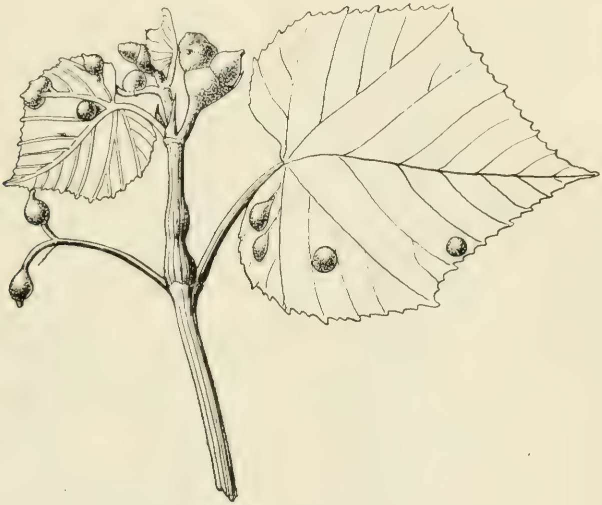

Fig. 173. Grape tomato gall, Lasioptera vitis O. S. (Original)

Somewhat cylindrical, reddish petiole galls, length 1.5 to 2.25 cm, diameter 5 to 6 mm, two or three larvae huddled together in cells in the pith
Itonid. Cecidomyia sp. a2684

Irregular, tumid, lobulate, greenish or reddish leaf or tendril gall, diameter .5 to 1.5 cm. Fig. 173. Osten Sacken '62, p. 201
Itonid. Grape tomato gall, Lasioptera vitis O. S.

Reared from similar gall. Felt '15e, p. 134
Itonid. Dasyneura vitis Felt

Reared from similar gall. Felt '15e, p. 206
Itonid. Rhizomyia vitis Felt

Reared from similar gall. Felt '13m, p. 220
Itonid. Brachyneura vitis Felt

Reared from similar gall. Felt '08e, p. 392
Itonid. Janetiella brevicauda Felt

Vein galls, solitary or confluent, frequently distorting the leaf and showing on both surfaces, color yellowish red, more obscure on the upper surface, diameter 10 to 12 mm. Mex. Trotter '11, p. 131

Itonid. Cecidomyia sp.

Circular, pinkish or greenish, pustulate leaf galls, the middle depressed on the upper surface and protuberant on the lower, diameter 2 to 3 mm. Pl. 9, fig. 5

Itonid. Grape blister gall, Cecidomyia sp. a2749

Elongate, conical, reddish or greenish leaf gall, length 6 to 9 mm. Fig. 174. Osten Sacken '62, p. 202

Itonid. Grape tube gall, Cecidomyia viticola O. S.

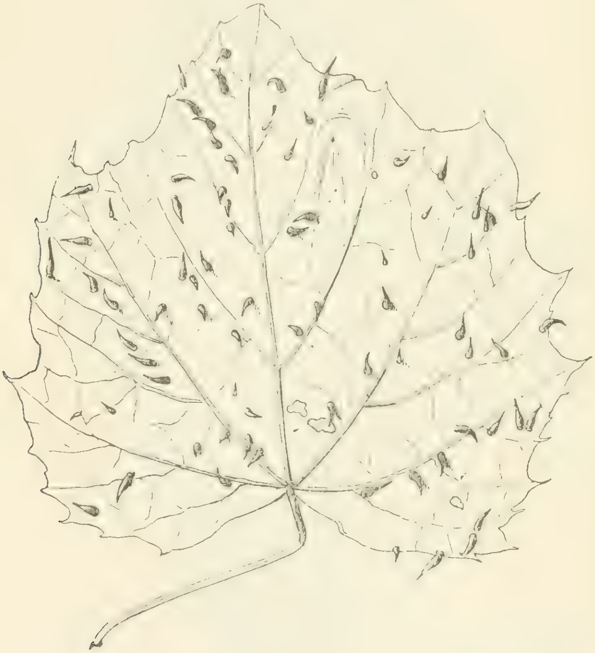

Fig. 174. Grape tube gall, Cecidomyia viticola O. S. (Original)

Irregular, subglobose leaf gall showing a swelling on the upper surface and a globose enlargement on the lower. Pl. 4, fig. 9.

Lepid. ?Coleophora sp.

Small, wartlike leaf galls on either the upper or the lower surface, diameter 2 to 3 mm.

Aphid. Grape phylloxera, Phylloxera vitifoliae Fitch

Reared from Phylloxera gall. Felt '15e, p. 195

Itonid. Lasiopteryx arizonensis Felt

Reared from similar gall, predaceous. Felt '08e, p. 408

Itonid. Lestodiplosis grassator Fyles

An orange brown to light chocolate colored erineum on the lower surface of the leaf, on V. bicolor. Chadwick '08, p. 150

Acarid. Eriophyes sp.

Small, semicircular or nearly circular, wart galls along the veins and but slightly elevated, on either surface, diameter 2 mm, on V. cordifolia. Chadwick '08, p. 151

Acarid. Eriophyes sp.

Quite distinct from the above, with a long, white pubescence, on the under surface, diameter 5 to 10 mm, on V. cordifolia. Chadwick '08, p. 151

Acarid. Eriophyes sp.

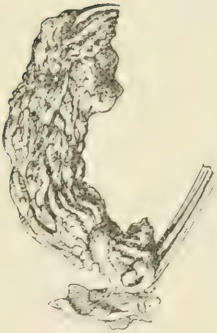

Fig. 175. Astrodiplosis speciosa Felt. Shrunken gall. (Original)

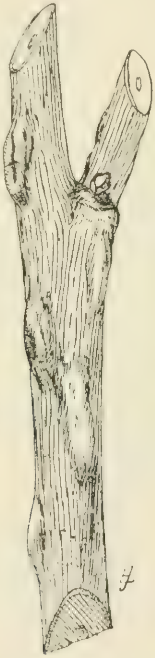

Fig. 176. Linden bark gall, Agromyza tiliae Coud. (Original)

Green, pouch gall with irregularly-lobed top and mostly on the under surface of the leaf, on V. cordifolia. Chadwick '08, p. 151

Acarid. Eriophyes sp.

An erineum on the under side of the leaf, causing a swelling above, on V. vinifera. Chadwick '08, p. 151

Acarid. Eriophyes vitis Land.

A leaf curl or warty, greenish elevation on the upper surface of the leaf, entirely smooth on the underside, becoming brown or reddish when old, on V vinifera. Chadwick '08, p. 151

Acarid. Eriophyes sp.

Irregular, oval cane galls, length 2 cm, diameter 1.5 mm.
Coleop. Grape cane weevil, Ampeloglypter sesostris Lec.

Cissus

Irregular, tumid, stem gall, length 2–9 cm. Fig. 175. Felt '13h, p. 218
Itonid. Astrodiplosis speciosa Felt

Tiliaceae (linden family)

Tilia (linden, basswood)

Irregular, oval, subcortical twig swellings, length 1 cm. Fig. 176. Couden '08, p. 35
Dipt. Linden bark gall, Agromyza tiliae Coud.

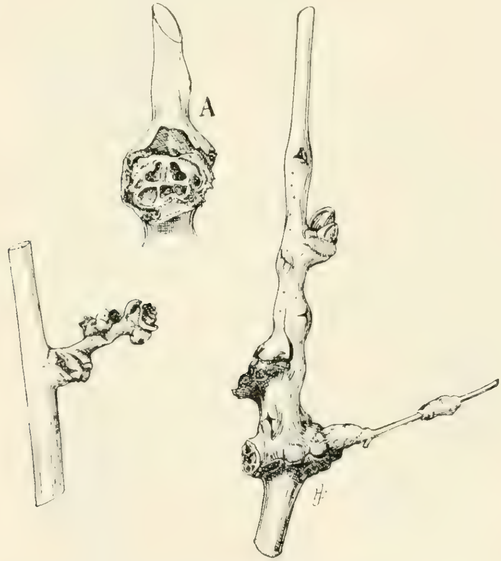

Fig. 177. Linden twig gall, Cecidomyia citrina O. S. Various types. (Original)

Irregular swellings on twigs and petioles, diameter 4 to 8 mm. Fig. 177. Osten Sacken '71, p. 53
Itonid. Linden twig gall, Cecidomyia citrina O. S.[1]

Irregular, subglobular, distorted galls at the base of the leaf or along the mid vein. Felt '15i, p. 156
Itonid. Colpodia pectinata Felt

Subglobular, brownish leaf galls, diameter 3 mm. Pl. 7, fig. 9. Osten Sacken '75, p. 201
Itonid. Linden wart gall, Cecidomyia verrucicola O. S.

Apparently reared from the same gall. Felt '08e, p. 418
Itonid. Porricondyla dilatata Felt

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[1] Rearing may prove this insect to be identical with Contarinia tiliarum Kieff.

Top-shaped, greenish leaf galls sometimes very abundant on the upper leaf surface, diameter 2.5 mm. Fig. 178, 179. Felt '06b, p. 631
Acarid. Linden mite gall, Eriophyes abnormis Garm.

Malvaceae (mallow family)

Gossypium (cotton)

Reared from flower buds. Felt '08b, p. 210
Itonid. Cotton bud midge, Contarinia gossypii Felt

Reared from red spider, on cotton. Felt '13n, p. 488
Itonid. Arthrocnodax carolinae Felt

Leaf galls sometimes deforming foliage. Parrott et al. '06, p. 290
Acarid. Eriophyes gossypii Bnks.

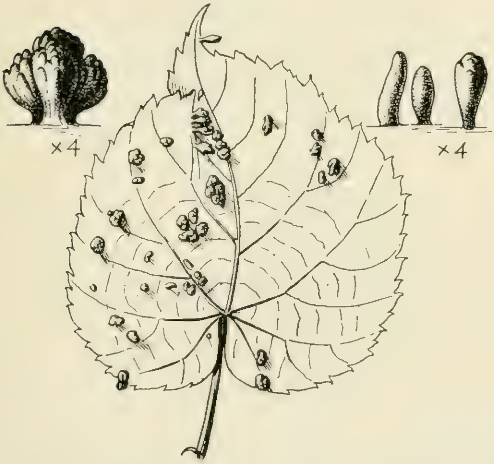

Fig. 178. Linden mite gall, Eriophyes abnormis Garm. Several types of gall in profile and enlarged. (Original)

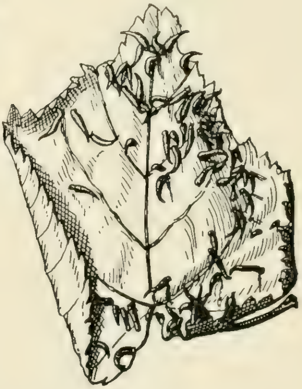

Fig. 179. Linden mite gall, Eriophyes abnormis Garm. Leaf with numerous galls, presumably this species. (Original)

Pocket-like galls on the mid rib, deforming but not preventing leaf development. Pierce and Morrill, '14, p. 20
Itonid. Cecidomyia sp.

Reared from cambium layer. Coq. '05, p. 200
Itonid. Porricondyla gossypii Coq.

Hibiscus moscheutos (swamp rose mallow)

Variably swollen stems. Fig. 180. Felt '07a, p. 155
Itonid. Mallow stem midge, Neolasioptera hibisci Felt

Hypericaceae (St John's-wort family)

Hypericum (St John's-wort)

Axillary bud galls, length 5 mm, on H. mutilum. Felt '15e, p. 187
Itonid. Dasyneura toweri Felt

Globular stalk swellings, length 6 to 10 mm. Beutm. '08, p. 74

Itonid. Cecidomyia triadenii Beutm.

Subglobose stem gall, length 1 cm. Felt '09e, p. 287

Itonid. Lasioptera virginica Felt

An erineum of very fine and numerous black spots on the upper leaf surface of H. virginicum. Chadwick '08, p. 149

Acarid. Eriophyes sp.

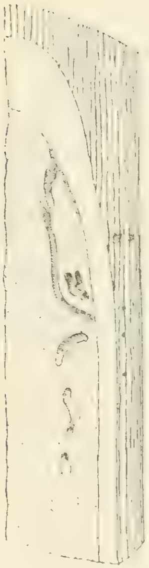

Fig. 180. Mallow stem midge, Neolasioptera hibisci Felt (Author's illustration)

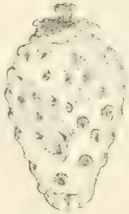

Fig. 181. Asphondylia betheli Ckll. Infested fruit. (Original)

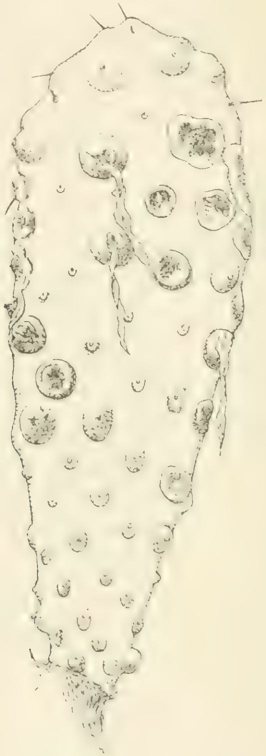

Fig. 182. Cactus midge, Itonida opuntiae Felt, showing characteristic appearance of infested lobe. (Original)

Violaceae (violet family)

Viola (violet)

Deformed fruit, irregular "plumlike," length 1 cm. Felt '15e, p. 166

Itonid. Violet fruit midge, Dasyneura semenivora Beutm.

Rolled, discolored leaves of V. odorata. Felt '07a, p. 59

Itonid. Violet leaf midge, Phytophaga violicola Coq.

Reared from red spider on violet leaves

Itonid. Arthrocnodax sp. a2346

Loasaceae (loasa family)

Mentzelia

Reared from flower buds. Ent., 33:302; Felt '16d, p. 149
Itonid. Asphondylia mentzeliae Ckll.

Cactaceae (cactus family)

Opuntia (prickly pear)

Very large, swollen fruit. Felt '16d, p. 148
Itonid. Asphondylia arizonensis Felt

Swollen fruit. Fig. 181. Cockerell '07, p. 324; Felt '16d, p. 122
Itonid. Asphondylia betheli Ckll.

Swollen leaves. Pl. 5, fig. 6. Felt '08e, p. 124, '16d, p. 144
Itonid. Asphondylia opuntiae Felt

Decayed, frequently yellowish spots at the base of spines. Fig. 182. Felt '10a, p. 10
Itonid. Cactus midge, Itonida opuntiae Felt

Elaeagnaceae (oleaster family)

Shepherdia canadensis

Oval bud gall. Felt '16g, p. 414
Itonid. Asphondylia shepherdiae Felt

Myrtaceae (myrtle family)

Eugenia

Deformed fruit. Felt '12d, p. 106
Itonid. Dasyneura eugeniae Felt

Hairy, globose leaf gall, diameter 1.5 mm. Felt '13a, p. 175
Itonid. Cystodiplosis eugeniae Felt

Lythraceae (loosestrife family)

Decodon (swamp loosestrife)

Globose bud gall, length 3–5 mm. Wells, '14, p. 291
Itonid. ? Dasyneura sp.

Onagraceae (evening primrose family)

Zauschneria

Rosette gall. Fig. 183. Felt '12e, p. 152
Itonid. Thecodiplosis zauschneriae Felt

Umbelliferae (parsley family)

Cicuta (water hemlock)

White larvae, probably on leaves. Felt. '11j, p. 458
Itonid. Cecidomyia sp.

Zizia (golden Alexanders)

Fusiform stem gall, length 3 cm. Fig. 184. Felt '08e, p. 327
Itonid. Lasioptera ziziae Felt

Cornaceae (dogwood family)

Garrya fremontii

Suboval, black, irregular bud gall. Felt '11j, p. 461
Itonid. Asphondylia sp.

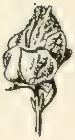

Fig. 183. Thecodiplosis zauschneriae Felt. A somewhat shriveled gall. (Original)

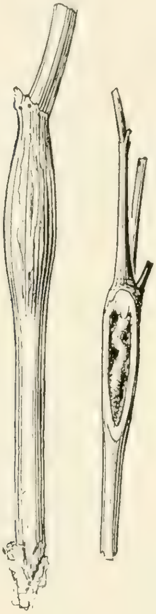

Fig. 184. Lasioptera ziziae Felt. Stem gall, one sectioned. (Original)

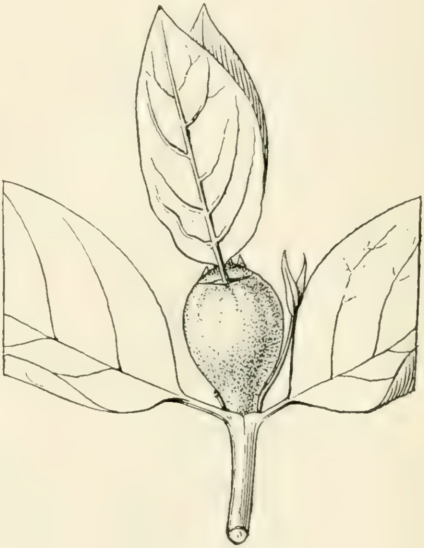

Fig. 185. Dogwood bud gall, Cecidomyia sp. (Original)

Cornus (dogwood)

Ovate, green, red-tinted, succulent, apical, shoot gall, length 1.5 cm, diameter 1 cm, on C. alternifolia. Fig. 185
Itonid. Dogwood bud gall, Cecidomyia sp. a2655

Clavate twig gall, length 1 to 2 cm, on C. florida. Fig. 186. Beutm. '92, p. 269
Itonid. Dogwood club gall, Lasioptera clavula Beutm.

Tubular, curved, green leaf gall, length 8 mm, on C. amomum. Stebb. '10, p. 46
Itonid. Dogwood tube gall, Cecidomyia tuba Stebb.

Yellowish, purple-margined blister leaf gall, diameter 2 to 3 mm, on C. stolonifera. Pl. 13, fig. 9. Felt '07a, p. 107

Itonid. Dogwood spot gall, Lasioptera corni Felt.

Irregular, subcortical, stem gall, length 1 to 2 cm, on C. stolonifera. Fig. 187, 188. Beutm. '07, p. 394

Itonid. Dogwood stem gall, Neolasioptera cornicola Beutm.

An erineum in small, blackish spots, on the upper side of the leaf. Chadwick '08, p. 131

Acarid. Eriophyes sp.

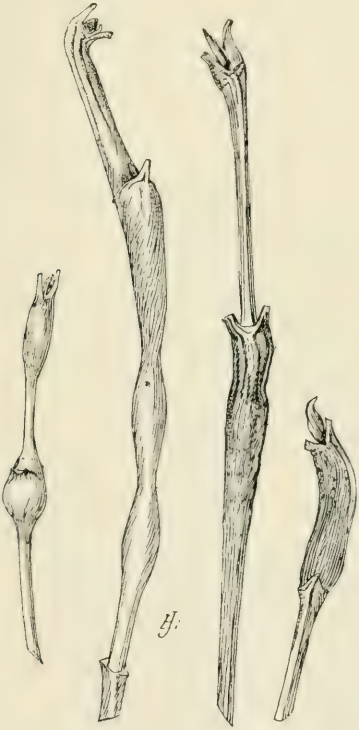

Fig. 186. Dogwood club gall, Lasioptera clavula Beutm., several types. (Original)

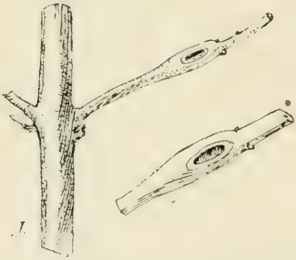

Fig. 187. Dogwood stem gall, Neolasioptera cornicola Beutm. (Original)

Nyssa (black or sour gum)

Twig gall, length 4 to 5 cm, diameter 8 mm. Felt '11j, p. 464

Itonid. Cecidomyia sp.

Marginal leaf fold, length 2.5 to 3.5 mm. Beutm. '07, p. 387

Itonid. Cecidomyia nyssaecola Beutm.

Small, round capsule gall on the leaf, often lobed above, conical below, with an opening at the apex. Chadwick '08, p. 136

Acarid. Eriophyes nyssae Trott.

A narrow infolding of the leaf margin upon the upper surface, dark brown when dry, elegantly scalloped. Chadwick '08, p. 136

Acarid. Eriophyes sp.

Ericaceae (heath family)

Rhododendron nudiflorum (pinxter)

Fusiform, brownish bud gall, length 7 mm. Fig. 189. Felt '16d, p. 119

Itonid. Pinxter bud gall, Asphondylia azaleae Felt

Fig. 188. Cornus twig gall, possibly the work of Neolasioptera cornicola Beutm. (Original)

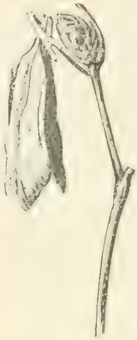

Fig. 189. Pinkster bud gall, Asphondylia azaleae Felt. (Original)

Gaylussacia frondosa (dangleberry)

Irregular globose monothalamous or lobulate polythalamous leaf gall, diameter 5–10 mm. Beutm. '07c, p. 392

Itonid. Cecidomyia (vaccinii O. S.)

Vaccinium (blueberry, cranberry)

Reared from blueberries (fruit). Woods '16, p. 266

Itonid. Blueberry midge, Lasioptera fructuaria Felt

Apical bud gall on blueberry. Felt '15e, p. 145

Itonid. Blueberry bud gall, Dasyneura cyanococci Felt

Oval, valved midrib leaf gall, length 3 mm, on blueberry. Osten Sacken, '62, p. 196

Itonid. Blueberry leaf gall, Dasyneura gaylussacii Felt (vaccinii O. S., not Smith)

Small, round galls (capsules?) on blueberry leaves. Chadwick '08, p. 150

Acarid. Eriophyes sp.

Irregularly rounded, frequently kidney-shaped, polythalamous, stem gall, green or brown, diameter 12 to 25 mm, on blueberry. Fig. 65, 2–8. Beutm. '09, p. 280

Cynipid. Blueberry stem gall, Solenozopheria vaccinii Ashm.

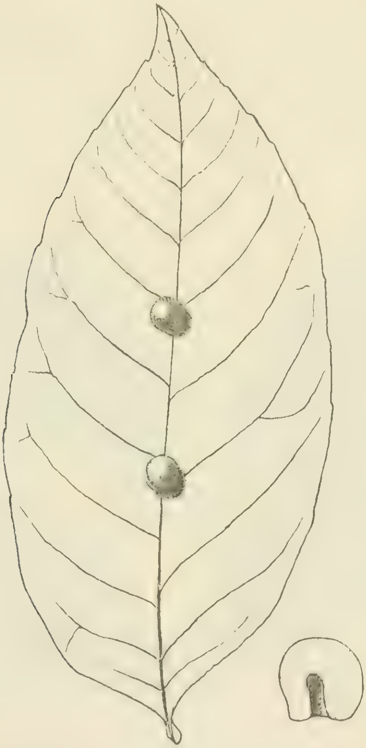

Fig. 190. Ash bullet gall, Cecidomyia pellex O.S. One gall in section and enlarged. (Original)

Leaf fold or bud gall on cranberry. Felt '15c, p. 150

Itonid. Cranberry midge, Dasyneura vaccinii Smith

Plumbaginaceae (leadwort family)

Limonium (sea lavender)

An erineum of very small, black spots on the upper side of the leaves. Chadwick '08, p. 148

Acarid. Eriophyes sp.

Primulaceae (primrose family)

Lysimachia (loosestrife)

Loose, apical bud gall. Pl. 9, fig. 9. Felt '15e, p. 182
Itonid. Loosestrife bud gall, Dasyneura lysimachiae Beutm.

Gall undetected, probably from vegetable matter. Felt '13m, p. 139
Itonid. Lestremia solidaginis Felt

Sapotaceae (sapodilla family)

Bumelia

Probably bud galls, on B. lanuginosa. Felt '16d, p. 124
Itonid. Asphondylia bumeliae Felt

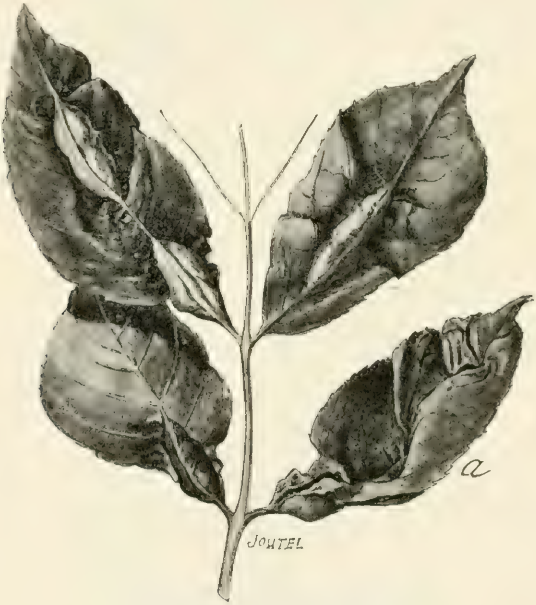

Fig. 191. Ash midrib gall, Contarinia canadensis Felt. (Author's illustration)

Ebenaceae (ebony family)

Diospyros (persimmon)

An erineum in numerous small patches on the upper side of the leaf. Chadwick '08, p. 132
Acarid. Eriophyes sp.

Oleaceae (olive family)

Fraxinus (ash)

Deformed, terminal, leafy buds on white ash. Felt '15e, p. 152
Itonid. Ash bud gall, Dasyneura apicata Felt

Subglobular, white ash leaf galls, diameter 5 mm. Felt '08e, p. 327

Itonid. Lasioptera fraxinifolia Felt

Apparently from the same gall. Felt '08e, p. 416

Itonid. Colpodia temeritatis Felt

Inhabiting a similar gall. Fig. 190. Osten Sacken '62, p. 199

Itonid. Ash bullet gall, Cecidomyia pellex O. S.

Large, tumid midrib gall on white ash, length 5 to 15 mm. Fig. 191. Felt '08e, p. 394

Itonid. Ash midrib gall, Contarinia canadensis Felt

Probably reared from the same gall. Felt '15e, p. 155

Itonid. Dasyneura tumidosae Felt

Reared from tightly-rolled leaves of white ash. Felt '15e, p. 133

Itonid. Dasyneura fraxinifolia Felt

Reared from badly rolled leaves. Fig. 192. Felt '15e, p. 203

Itonid. Rhizomyia fraxinifolia Felt

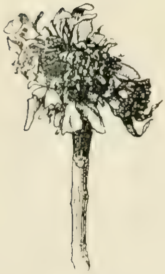

Fig. 192. Rhizomyia fraxinifolia Felt. Deformed head. (Original)

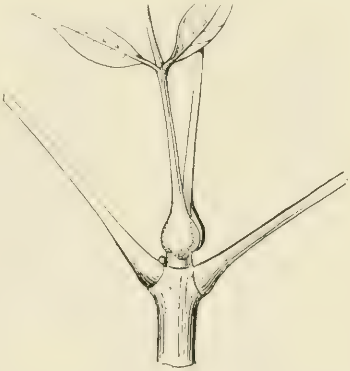

Fig. 193. Ash petiole midge, Phytophaga fraxini Felt. (Original)

Reared from badly rolled leaves of white ash, probably predaceous. Felt '08e, p. 408

Itonid. Lestodiplosis fraxinifolia Felt

Badly curled, purple-streaked terminal leaves. Pl. 15, fig. 3. Felt '11m, p. 39

Hemip. Ash psyllid, Psyllopsis fraxinicola Forst.

Reared from base of leaf petioles of white ash. Fig. 193. Felt '15i, p. 206

Itonid. Ash petiole midge, Phytophaga fraxini Felt

Lobulate deformations of the staminate flowers of white ash, diameter 6 to 12 mm. Pl. 15, fig. 9. Felt '06b, p. 633

Acarid. Ash flower gall, Eriophyes fraxiniflora Felt

Elongate capsule or vein galls on the leaves, pinkish above, whitish beneath, on one side of the vein, on white ash. Chadwick '08, p. 134

Acarid. Eriophyes sp.

Typical capsule leaf galls, small, irregular, circular and light green in color, opening below. Chadwick '08, p. 134

Acarid. Eriophyes sp.

Depressed, wartlike leaf galls on green ash. Parrott et al. '06, p. 290
Acarid. Eriophyes sp.

Hairy, capsule galls on red ash leaves. Pl. 15, fig. 8. Chadwick '08, p. 134
Acarid. Eriophyes fraxini Garm.

Apocynaceae (dogbane family)

Apocynum (dogbane)

Reared from slightly enlarged flower buds. Felt '08e, p. 414
Itonid. Dogbane flower midge, Itonida apocyni Felt

Reared from unopened flower buds, probably predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis apocyniflorae Felt

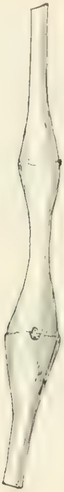

Fig. 194. Milkweed stem midge, Neolasioptera asclepiae Felt. (Author's illustration)

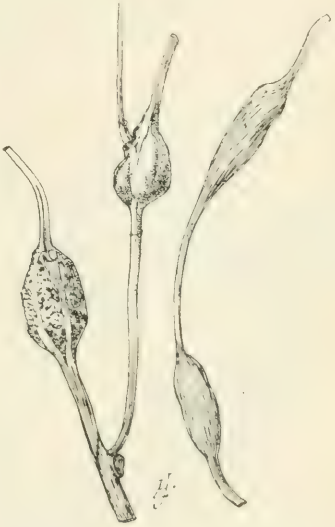

Fig. 195. Bindweed stem gall, Lasioptera convolvuli Felt. (Author's illustration)

Asclepiadaceae (milkweed family)

Asclepias (milkweed)

Oval, tumid midrib fold, length 7 mm, diameter 4 mm, on A. incarnata Felt '11j, p. 454
Itonid. Cecidomyia sp.

Rusty brown, irregularly swollen leaves, on A. incarnata. Felt '11j, p. 454
Itonid. Cecidomyia sp.

Reared from rolled leaves of A. syriaca, probably predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis asclepiae Felt

Elongate, fusiform stem gall, on A. incarnata. Fig. 194. Felt '08e, p. 332
Itonid. Milkweed stem midge, Neolasioptera asclepiae Felt

Convolvulaceae (convolvulus family)

Ipomoea (morning-glory)

Reared from flower buds. Felt '10b, p. 160
Itonid. Schizomyia ipomoeae Felt

Flower buds. Felt '10c, p. 269
Itonid. Camptoneuromyia meridionalis Felt

Convolvulus sepium (hedge bindweed)

Fusiform stem gall, monothalamous, length 1.5 cm. Fig. 195. Felt '07a, p. 149
Itonid. Bindweed stem gall, Lasioptera convolvuli Felt

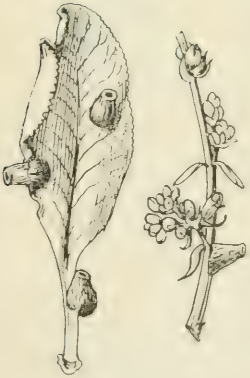

Fig. 196. Rhopalomyia audibertiae Felt. Galls on leaf and flower stem. (Original)

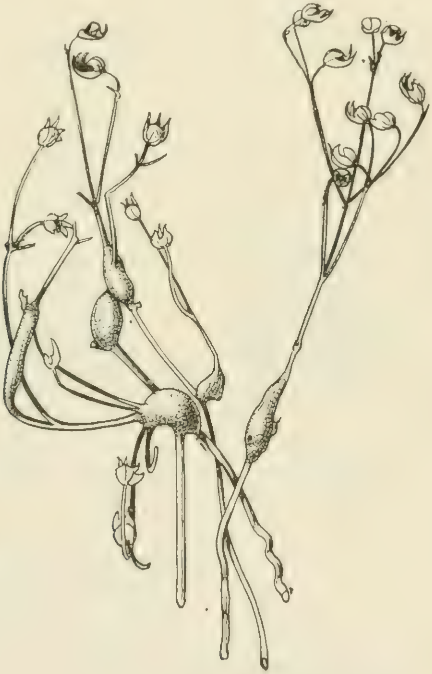

Fig. 197. Blue curls stem gall, Stagmatophora sexnotella Chamb. (Original)

Boraginaceae (borage family)

Amsinckia lycopsoides

Reared from an undescribed, presumably bud gall. Felt '16d, p. 106
Itonid. Schizomyia macrofila Felt

Verbenaceae (vervain family)

Verbena (vervain)

Cylindric swelling of the flower stalk of V. rostrata. Felt '12e, p. 150
Itonid. Lasioptera verbeniae Felt

Irregular, oval, stem gall, length 3 to 5 mm. Felt '11j, p. 474

Itonid. Cecidomyia sp.

Reared from marginal leaf rolls. Beutm. '07d, p. 306

Itonid. Vervain leaf midge, Itonida verbenae Beutm.

Reared from rolled leaves, probably predaceous. Felt '08e, p. 408

Itonid. Lestodiplosis verbenifolia Felt

A white and pinkish, frostlike erineum and leaf curl involving the whole plant and apparently very destructive, on V. hastata. Chadwick '08, p. 150

Acarid. Eriophyes sp.

Stachytarpha jamaicensis

Reared from a flower gall, probably produced by mites. Felt '12a, p. 177

Itonid. Hyperdiplosis producta Felt

Clerodendron aculeatum

Reared from a flower bud gall. Felt '09c, p. 300

Itonid. Asphondylia attenuatata Felt

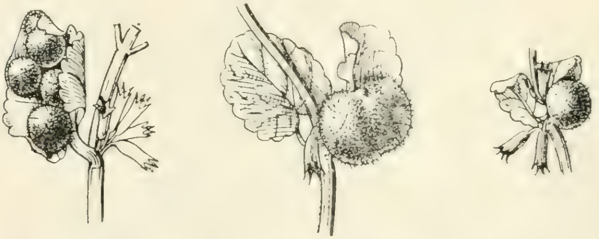

Fig. 198. Cat mint gall, Aylax glechomae Linn. Several types of gall. (Original)

Labiatae (mint family)

Audibertia stachyoides

Subcylindrical, somewhat irregular, the base swollen, grayish or light brown leaf petiole or flower stem galls, length 5 mm, diameter 3 mm. Fig. 196. Felt '07e, p. 18

Itonid. Rhopalomyia audibertiae Felt

Trichostema (blue curls)

Irregular, reniform stem gall, tapering somewhat above, obtuse below, length 18 mm, diameter 6 mm. Fig. 197. Stebb. '10, p. 47

Lepid. Blue curls stem gall, Stagmatophora sexnotella Chamb.

Scutellaria (skullcap)

Oval, greenish, stem gall, length 8 mm. Felt '11j, p. 470

Itonid. Cecidomyia sp.

Nepeta (cat mint)

Globular or irregular, monothalamous or polythalamous leaf petiole or stem gall, the simple galls with a diameter of 6 mm. Fig. 198. 235, 1-3. Beutm. '10a, p. 138

Cynipid. Cat mint gall, Aylax glechomae Linn.

Galeopsis (hemp nettle)

Irregular, stem gall, length .5 to 2 cm. Felt '09e, p. 287

Itonid. Hemp nettle gall, Lasioptera galeopsidis Felt

Salvia (sage)

A conical, thick-walled, grayish brown leaf gall with a length 1 cm and a diameter 6 mm or a tubular, thin-walled leaf gall, with a length of 6 mm, on S. californica and S. nivea. Fig. 199. Felt '16f, p. 184

Itonid. Salvia leaf gall, Rhopalomyia salviae Felt

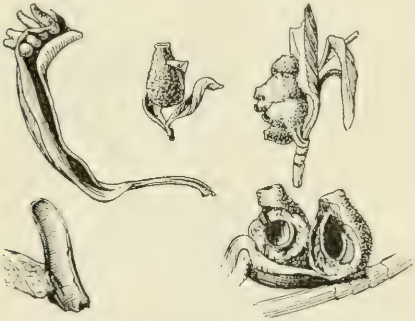

Fig. 199. Salvia leaf gall, Rhopalomyia salviae Felt. Several types of gall, two in section. (Original)

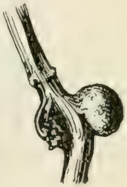

Fig. 200. Cecidomyia sp. on Monarda, a2704, enlarged. (Original)

Monarda fistulosa (wild bergamot)

Variable, stem gall, length 10 to 22 mm. Brodie '94, p. 109

Itonid. Cecidomyia monardi Brodie

Ovate root stalk bud gall, length 2.5 mm, diameter 2 mm. Fig. 200.

Itonid. Cecidomyia sp. a2704

Lycopus (water horehound)

Subglobular, stem gall, length 8 to 10 mm. Fig. 201. Felt '07a, p. 152

Itonid. Lasioptera lycopi Felt

Fusiform stem gall, length 1.5 to 2 cm. Fig. 202. Felt '08e, p. 325

Itonid. Lasioptera mitchellae Felt

Mentha (mint)

Terminal bud gall, length 3 mm, on M. gentilis. Felt '11j, p. 464

Itonid. Cecidomyia sp.

Axillary or terminal bud gall, length 4 mm, on M. ?spicata. Felt '15e, p. 183

Itonid. Spearmint bud gall, Dasyneura aromaticae Felt

Loose bud gall, length 3 mm, on M. piperita. Felt '15e, p. 136

Itonid. Peppermint bud gall, Dasyneura piperitae Felt

Pustule gall in the axil of the leaf, diameter 3.5 mm, on M. canadensis. Felt '08e, p. 405

Itonid. Giardomyia menthae Felt

Polythalamous, stem gall, length 6 to 12 mm. Fig. 203. Felt '09e, p. 288

Itonid. Neolasioptera menthae Felt

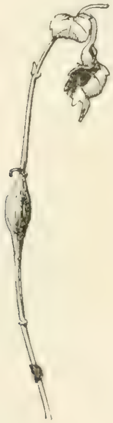

Fig. 201. Lasioptera lycopi Felt. (Original)

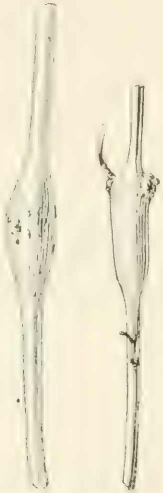

Fig. 202. Lasioptera mitchellae Felt. Two types of gall. (Original)

Collinsonia (horse balm)

Subglobular, pubescent leaf gall, length 4 to 7 mm. Beutm. '08b, p. 703

Itonid. Cecidomyia collinsoniae Beutm.

Narrow, midrib or vein swelling. Beutm. '08b, p. 74

Itonid. Cecidomyia collinsonifolia Beutm.

Solanaceae (nightshade family)

Lycopersicum esculentum (tomato)

Reared from flowers. Felt '11e, p. 303

Itonid. Tomato flower gall, Contarinia lycopersici Felt

Solanum carolinense (horse nettle)

Irregular, spiny, stem gall, length 3.75 to 5 cm. Fig. 204. Felt '07a, p. 164

Itonid. Horse nettle gall, Neolasioptera solani Felt

Scrophulariaceae (figwort family)

Scrophularia (figwort)

Reared from distorted flower buds, probably predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis scrophulariae Felt

Pentstemon (bearded tongue)

Fusiform stem or branch gall, monothalamous, length 15 mm, diameter 3 mm. Fig. 205
Itonid. Lasioptera tibialis Felt

Mimulus (monkey flower)

Stem gall, undescribed. Felt '08e, p. 332
Itonid. Neolasioptera mimuli Felt

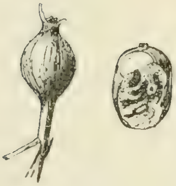

Fig. 203. Neolasioptera menthae Felt. One gall in section. (Original)

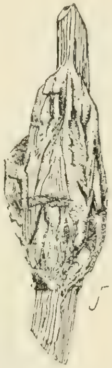

Fig. 204. Horse nettle gall, Neolasioptera solani Felt. (Author's illustration)

Diplacus

Ovoid, stem gall. Felt '12e, p. 151
Itonid. Lasioptera diplaci Felt

Cabbage bud gall. Fig. 206. Felt '12e, p. 151
Itonid. Asphondylia diplaci Felt

Gerardia flava (downy false foxglove)

Larvae in seed pods. Fig. 207. Felt '11j, p. 461
Itonid. Cecidomyia sp.

" Deformation of the leaf." Chadwick '08, p. 132
Acarid. Eriophyes sp.

Bignoniaceae (bignonia family)

Tecoma (trumpet flower)

Reared from irregularly curled and wrinkled leaves. Felt '06a, p. 127
Itonid. Itonida tecomiae Felt

Catalpa (catalpa)

Reared from dwarfed shoots and pods. Comst. '81, p. 266
Itonid. Catalpa midge, Itonida catalpae Comst.

Plantaginaceae (plantain family)

Plantago (plantain)

Reared from apparently normal plants, probably predaceous. Felt '11j, p. 465
Itonid. ?Lestodiplosis sp.

Rubiaceae (madder family)

Galium (bedstraw)

Aborted flower buds, diameter 3 mm. Felt '15e, p. 168
Itonid. Bedstraw midge, Dasyneura americana Felt

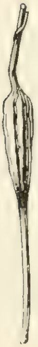

Fig. 205. Lasioptera tibialis Felt. (Original)

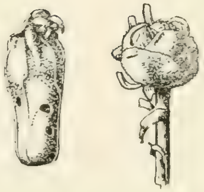

Fig. 206. Asphondylia diplaci Felt. Two types of gall. (Original)

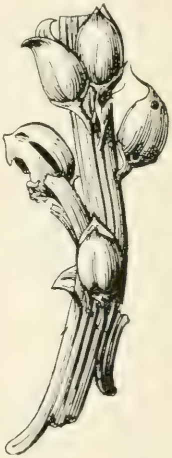

Fig. 207. Cecidomyia sp. Infested seed pods of Gerardia. (Original)

Upper whorls of leaves with the margins longitudinally inrolled, on Galium triflorum
Acarid. Eriophyes galii Karp.

Cephalanthus (buttonbush)

Twig gall, undescribed. Felt '15e, p. 104
Itonid. Buttonbush twig gall, Rhabdophaga cephalanthi Felt

Clusters of small, paler or reddish protuberances (dimples?) on the upper side of the leaf, beneath with a white pubescence, height 1 to 3 mm. Chadwick '08, p. 130
Acarid. Eriophyes cephalanthi Cook

A pocket gall, like that on Salix nigra. Chadwick '08, p. 130
Acarid. Eriophyes sp.

Caprifoliaceae (honeysuckle family)

Diervilla (bush honeysuckle)

Green bud gall or enlarged fruit, length 4 to 5 mm. Felt '16d, p. 140

Itonid. Bush honeysuckle bud midge, Asphondylia diervillae Felt

Reared from apparently normal stems having a diameter of 3 to 4 mm. Felt '07a, p. 162

Itonid. Bush honeysuckle stem midge, Lasioptera caulicola Felt

Lonicera (honeysuckle)

Irregular, lobulate bud gall with a short, rusty brown pubescence, diameter 7 to 10 mm.

Itonid. Cecidomyia sp. a2657

Symphoricarpos (snowberry)

Irregularly thickened, distorted leaflets. Felt '14c, p. 132

Itonid. Thomasia californica Felt

Fusiform twig gall.

Itonid. Cecidomyia sp.

Viburnum (arrowwood)

Globose bud gall, length 4 mm. Felt '16d, p. 104

Itonid. Arrowwood bud midge, Schizomyia viburni Felt

Purplish swellings on the lateral veins, length 5 mm. Pl. 13, fig. 5. Felt '15i, p. 280

Itonid. Purple vein midge, Sackenomyia viburnifolia Felt

Purplish discolorations along the veins, showing on both sides of the leaf and making a striking pattern, on V. pubescens. Fig. 208. Chadwick '08, p. 150

Acarid. Eriophyes sp.

Minute, blister gall on the under side of the leaf, diameter 2 mm. Pl. 9, fig. 7. Felt '11k, p. 480

Itonid. Arrowwood blister midge, Cystiphora viburnifolia Felt

Circular, blister gall, diameter 1.5 to 2 mm, on V. cassinoides. Felt '11j, p. 474

Itonid. Cecidomyia sp.

Pustule, blisterlike gall with pinkish aureola, diameter 3 mm, on V. acerifolium. Felt '11j, p. 474

Itonid. Arrowwood spot gall, Cecidomyia sp.

Inconspicuous, pale green, circular leaf mines, diameter 5 to 6 mm, on V. opulus

Itonid. Cecidomyia sp. a2764

Oval, greenish, blister gall, showing on both surfaces, diameter 2 mm, larvae deep red, escape through a central hole in the upper surface, on V. dentatum. Felt '11j, p. 474

Itonid. Cecidomyia sp.

Large, irregular, lobed dimples, convex above, rarely reversed, pubescent without, long, slender hairs within, on V. dentatum. Chadwick '08, p. 150
Acarid. Eriophyes sp.

Marginal leaf roll, length 10 mm, on V. cassinoides. Felt '11j, p. 474
Itonid. Cecidomyia sp.

Irregular, subcortical gall, length 2 to 6 cm, on V. dentatum. Fig. 209 Beutm. '07c, p. 398
Itonid. Arrowwood stem midge, Neolasioptera viburnicola Beutm.

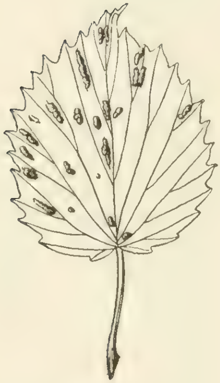

Fig. 208. Eriophyes sp. on Viburnum. (Original)

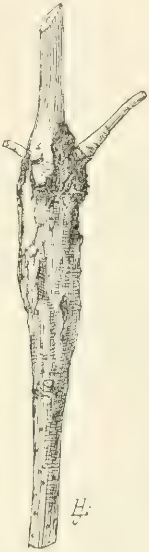

Fig. 209. Arrowwood stem midge, Neolasioptera viburnicola Beutm. (Original)

Sambucus (elder)

Swollen, unopened florets. Pl. 13, fig. 7. Beutm. '07c, p. 393
Itonid. Elder flower midge, Youngomyia umbellicola O. S.

Bud gall, diameter 1.5 cm. Fig. 210. Felt '16d, p. 139
Itonid. Elder bud midge, Asphondylia sambuci Felt

Leaf margin rolled tightly upward and inward on both sides and bearing stout, whitish or brownish trichomes within. Chadwick '08, p. 147
Acarid. Eriophyes sp.

Rolled leaves, probably predaceous. Pl. 5, fig. 1. Felt '08e, p. 404
Itonid. Arthrocnodax sambucifolia Felt

Irregular, subcortical gall, length 2 to 4 cm. Fig. 211. Felt '06a, p. 132
Itonid. Elder stem midge, Neolasioptera sambuci Felt

Cucurbitaceae (gourd family)

Cucumeris (melon)

Reared from curled, slightly enlarged tips. Lintn. '96, p. 168

Itonid. Melon tip midge, Contarinia setigera Lintn.

Reared from aphids infesting melon tips. Felt '08e, p. 397

Itonid. Melon aphid midge, Aphidoletes cucumeris Lintn.

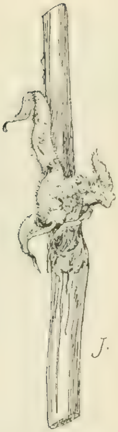

Fig. 210. Elder bud midge, Asphondylia sambuci Felt. (Author's illustration)

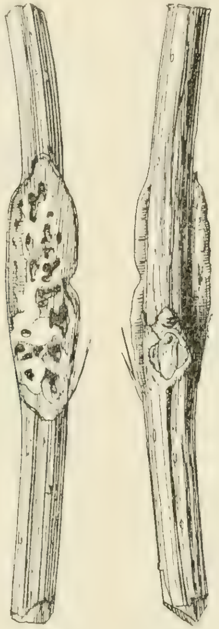

Fig. 211. Elder stem midge, Neolasioptera sambuci Felt. One gall in section and another shown behind the normal stem. (Original)

Compositae (composite family)

Vernonia (ironweed)

Probably from a bud gall. Felt '16d, p. 135

Itonid. Ironweed bud midge, Asphondylia vernoniae Felt

Reared from blossoms. Felt '11k, p. 552

Itonid. Ironweed blossom midge, Youngomyia vernoniae Felt

Reared from deformed florets or an oval petiole or midrib gall, with a length of 6 mm. Beutm. '07c, p. 389

Itonid. Lasioptera vernoniae Beutm.

Eupatorium purpureum (Joe-pyeweed)

Oval, blossom bud gall, length 1 cm. Felt '15e, p. 181

Itonid. Joe-pyeweed blossom midge, Dasyneura purpurea Felt

Eupatorium perfoliatum (thoroughwort, boneset)

Reared from florets. Felt '08e, p. 391

Itonid. Boneset blossom midge, Contarinia perfoliata Felt

Reared from apparently normal florets. Felt '07e, p. 6

Itonid. Clinorhyncha eupatoriflorae Felt

Oval, stem gall, length 1 to 1.5 cm. Felt '07a, p. 156

Itonid. Boneset stem midge, Neolasioptera perfoliata Felt

Reared from apparently the same gall. Felt '13m, p. 221

Itonid. Brachyneura eupatorii Felt

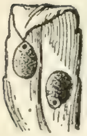

Fig. 212. Tar weed blister midge, Asteromyia grindeliae Felt. (Original)

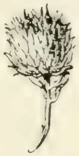

Fig. 213. Tar weed blossom midge, Rhopalomyia grindeliae Felt. Infested head. (Original)

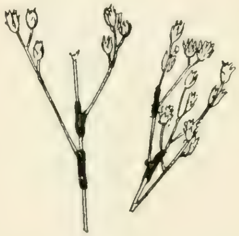

Fig. 214. Black gouty gall, Asteromyia gutierreziae Felt. (Original)

Eupatorium urticaefolium (white snakeroot)

Globose, flower bud galls, length 6 mm, probably predaceous. Pl. 11, fig. 1. Felt '11k, p. 121

Itonid. Lestodiplosis eupatorii Felt

Subglobular stem gall, length 1.5 cm. Felt '07a, p. 154

Itonid. Neolasioptera eupatorii Felt

Green, fleshy, stem gall similar to the preceding. Felt '11k, p. 546

Itonid. Asphondylia eupatorii Felt

Oval, yellowish leaf mine, diameter 5 to 7 mm.

Itonid. Cecidomyia sp.

Mikania (climbing hempweed)

Fusiform, internodal stem gall, length 1 to 2.5 cm, diameter .5 to 1.25 cm. Wells '14, p. 292

Dipt. ?Trypetid

Grindelia (gum-plant, tar-weed)

Oval, blister leaf gall, greenish or blackish, diameter 3 to 4 mm, on G. robusta, G. cuneifolia. Fig. 212. Felt '12e, p. 149; '16f, p. 180

Itonid. Tar-weed blister midge, Asteromyia grindeliae Felt

Reared from apparently unmodified flower heads. Fig. 213. Felt '16f, p. 186

Itonid. Tar-weed blossom midge, Rhopalomyia grindeliae Felt

Gutierrezia sarothrae

Oval, flower bud gall, length 7 mm. Felt '15i, p. 274

Itonid. Gutierrezia bud midge, Rhopalomyia gutierreziae Ckll.

Slight enlargement of the slender stems, composed of blackened tissue, length 6 to 8 mm, diameter 1 mm. Fig. 214. Felt '16f, p. 179

Itonid. Black gouty gall, Asteromyia gutierreziae Felt

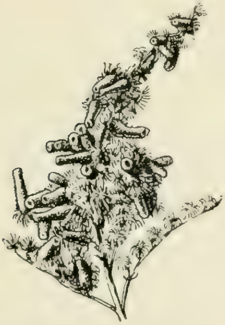

Fig. 215. Downy flower gall, Rhopalomyia anthophila O. S. Cluster of galls. (Original)

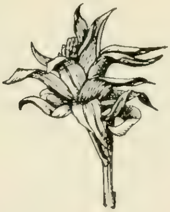

Fig. 216. Nun midge, Asphondylia monacha O. S. Apical bud gall. (Original)

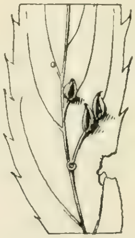

Fig. 217. Clarke's goldenrod gall, Rhopalomyia clarkei Felt. (Original)

Chrysopsis (golden aster)

Woolly, polythalamous bud gall, diameter 1.5 cm. Felt '15i, p. 278

Itonid. Golden aster bud midge, Rhopalomyia chrysopsidis Lw.

Solidago (goldenrod)

Flower galls

Greenish or reddish, subglobular, budlike galls, diameter 2 mm, on S. canadensis. Pl. 12, fig. 6. Felt '15i, p. 249

Itonid. Beaked flower gall, Rhopalomyia racemicola O. S.

Green, densely pubescent, cylindrical gall, length 6 mm, on S. canadensis. Fig. 215, p' 12, fig. 5. Felt '15i, p. 251

Itonid. Downy flower gall, Rhopalomyia anthophila O. S.

Reared from undescribed flower gall. Felt '15i, p. 268

Itonid. Rhopalomyia cruziana Felt

Florets apparently unaffected. Osten Sacken '69, p. 299; Felt, '16d, p. 127
Itonid. Nun midge, Asphondylia monacha O. S.
Florets apparently unaffected, gall undescribed. Felt '16d, p. 143
Itonid. Asphondylia johnsoni Felt

Bud galls

Apical bud galls

Loose, convolute mass of developing leaves, diameter 6.5 mm. Felt '07a, p. 110
Itonid. Asteromyia convoluta Felt

Loose, apical pod of narrow, adherent leaves, on S. canadensis. Felt '15e, p. 199
Itonid. Dryomyia folliculi Felt

Two or more leaves with the edges adherent, length 2.5 to 5 cm, on S. graminifolia. Felt '15e, p. 148
Itonid. Dasyneura flavicornis Felt

Galls pyriform, composed of closely adherent leaves, length 1 mm, on S. graminifolia and S. canadensis. Felt '08e, p. 327
Itonid. Camptoneuromyia flavescens Felt

Probably a loose apical bud gall, on S. graminifolia. Felt '15e, p. 132
Itonid. Dasyneura carbonaria Felt

Subglobose, white or brownish, apical galls on stems or subterranean root stalks, diameter 2.5 cm, on S. juncea. Pl. 12, fig. 9. Felt '15i, p. 242
Itonid. Rootstalk bud midge, Rhopalomyia hirtipes O. S.

Apical, cylindric bud gall on subterranean root stalk, length 6 mm, diameter 2.5 mm. Pl. 12, fig. 7. Felt '15i, p. 260
Itonid. Rhopalomyia bulbula Felt

Apical rosette galls

On Solidago canadensis

Deformed head, diameter about 11 cm, height 3 cm, and composed ot numerous smaller heads. Felt '15i, p. 255
Itonid. Rhopalomyia carolina Felt

Gall pyriform, composed of closely adherent leaves, length 1 mm. Felt '08e, p. 327
Itonid. ?Camptoneuromyia flavescens Felt

Globular, the head with a diameter of 4 to 5 cm. Pl. 13, fig. 2. Felt '15i, p. 246
Itonid. Goldenrod bunch gall, Rhopalomyia solidaginis Lw.

Large, rosette gall similar to the above. Felt '15j, p. 253
Itonid. Rhopalomyia albipennis Felt

Reared from similar gall. Felt '08e, p. 409
Itonid. Lestodiplosis carolinae Felt

Large, rosette gall, predaceous. Felt '08e, p. 409
Itonid. Lestodiplosis solidaginis Felt

Large, terminal, rosette gall, probably inquiline. Felt '15i, p. 230
Itonid. Oligotrophus inquilinus Fel

On Solidago canadensis and S. serotina

Gall composed of numerous small cells and with a diameter of 2.5 cm. Felt '15i, p. 245

Itonid. Goldenrod rosette midge, Rhopalomyia capitata Felt

Reared from the same gall. Felt '15i, p. 248

Itonid. Rhopalomyia inquisitor Felt

On Solidago graminifolia

Moderately loose apical bud gall, diameter 1 to 1.5 cm, resembles that of Oedaspis polita. Fig. 216, pl. 5, fig. 5. Osten Sacken '69, p. 299; Felt '16d, p. 127

Itonid. Nun midge, Asphondylia monacha O. S.

Presumably reared from the same gall. Felt '08e, p. 327

Itonid. Camptoneuromyia flavescens Felt

Gall similar to the above, possibly inquiline. Felt '15j, p. 269

Itonid. Rhopalomyia lanceolata Felt

On Solidago sempervirens

Small, loose apical bud gall as described above. Osten Sacken '69, p. 299. Felt '16d, p. 127

Itonid. Nun midge, Asphondylia monacha O. S.

On Solidago altissima

Small, rosette gall, length 12 to 18 mm, and containing a small larval cell. Stebb. '10, p. 52

Dipt. Small rosette gall, Oedaspis polita Lw.
Oedaspis atra Lw.

Leaf galls

Galls attached to one or at most two leaves and producing a marked deformity

On Solidago graminifolia

Gall fusiform, sessile, ribbed, greenish, with red markings, length 6 mm. Felt '15i, p. 254

Itonid. Goldenrod ribbed gall, Rhopalomyia fusiformis Felt.

Gall fusiform, stemmed, green, red-marked, length 13 to 14 mm. Felt '15i, p. 262

Itonid. Goldenrod stemmed gall, Rhopalomyia pedicellata Felt

On Solidago puberla or S. juncea

Gall oval, irregular, greenish, composed of clusters of root leaves, length 1 cm. Felt '15e, p. 178

Itonid. Dasyneura radifolii Felt

On Solidago rugosa

Gall fusiform, sessile, green, red-marked, length 1.6 mm. Fig. 217. Felt '15i, p. 239

Itonid. Clarke's goldenrod gall, Rhopalomyia clarkei Felt

On Solidago canadensis and S. serotina

Oval gall (Adherent capsule gall) between adherent leaves, diameter 2 mm. Pl. 5, fig. 4. Osten Sacken '69, p. 299. Felt '16d, p. 127

Itonid. Nun midge, Asphondylia monacha O. S.

Reared from similar gall. Pl. 5, fig. 4. Felt '08e, p. 291

Itonid. Camptoneuromyia adhesa Felt

Possibly reared from the same gall. Felt '08e, p. 324

Itonid. Lasioptera argentisquamae Felt

Possibly reared from the same gall, probably predaceous. Felt '08e, p. 335

Itonid. Trotteria solidaginis Felt

Blisterlike galls occurring in the leaf tissues and producing at most a slight thickening and discoloration

Gall oval, black, length 4 to 5 mm, on S. graminifolia. Osten Sacken '62, p. 195

Itonid. Black blister gall, Asteromyia carbonifera Felt

Irregular, grayish brown, black-margined, diameter 3 mm, on S. squarrosa. Felt '08e, p. 329

Itonid. Asteromyia squarrosae Felt

Circular, marginal, golden-gray gall, diameter 3.5 mm, on S. canadensis. Felt '08e, p. 329

Itonid. Asteromyia flavoanulata Felt

Circular, variable pink or rosy gall, diameter 1 cm, on S. rugosa. Felt '07a, p. 152

Itonid. Rosy blister gall, Asteromyia rosea Felt

Oval blister gall, on S. canadensis, presumably reared from. Felt '08e, p. 328

Itonid. Asteromyia socialis Felt

Reared from blister gall on Solidago and also from Aster, the gall on the latter with a diameter of 3 to 4 mm. Felt '07a, p. 111

Itonid. Asteromyia albomaculata Felt

Oval, variegated gall, the older ones mostly black, the younger yellowish olive with a darker central nipple, diameter 3 to 6 mm, on S. rugosa. Felt '07a, p. 103

Itonid. Asteromyia rubra Felt

Apparently reared from a similar gall, probably predaceous. Felt '08e, p. 409

Itonid. Lestodiplosis rugosa Felt

Semioval, marginal, yellowish gall, length 1 cm, on S. canadensis. Felt '07a, p. 154

Itonid. Yellow blister gall, Asteromyia flavolunata Felt

Elongate, yellowish brown, blistered area, length 3 cm, on S. canadensis, probably predaceous. Felt '08e, p. 410

Itonid. Lestodiplosis triangularis Felt

Stem and root galls

On Solidago graminifolia

Fusiform, sessile, ribbed, greenish, red-marked gall, length 6 mm. Felt '15i, p. 254

Itonid. Goldenrod ribbed gall, Rhopalomyia fusiformis Felt

Fusiform, stemmed, red-marked, green gall, length 13 to 14 mm. Felt '15i, p. 262
Itonid. Goldenrod stemmed gall, Rhopalomyia pedicellata Felt

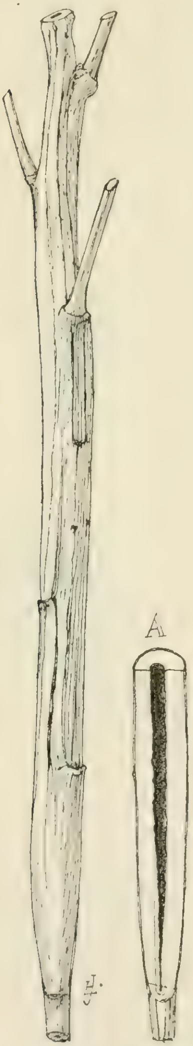

Fig. 218. Goldenrod stem midge, Lasioptera cylindrigallae Felt. (Author's illustration)

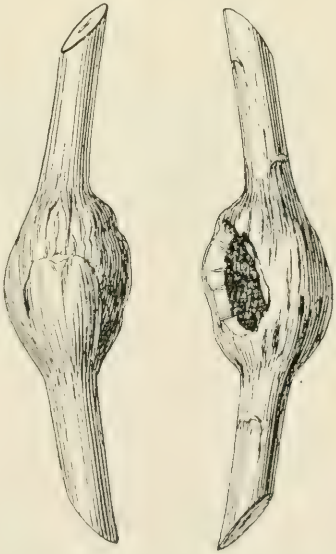

Fig. 219. Knotty goldenrod gall, Lasioptera solidaginis O. S. One gall broken open to show interior. (Original)

Subglobular, green gall near the tip, diameter 1.5 cm. Felt '15i, p. 264
Itonid. Rhopalomyia lobata Felt

A uniform enlargement of the stem, length 10 cm, diameter 7 mm. Fig. 218. Felt '07a, p. 150

Itonid. Goldenrod stem midge, Lasioptera cylindrigallae Felt

On Solidago, various species

Irregular, globo-conical lateral stem gall, greenish, diameter 3 mm, on Solidago occidentalis

Itonid. Cecidomyia sp. a2702

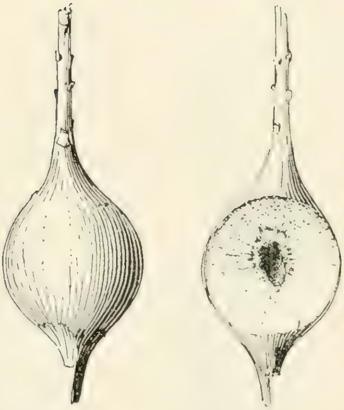

Fig. 220. Goldenrod ball gall, Eurosta solidaginis Fitch. One partly in section. (Original)

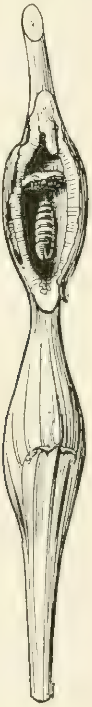

Fig. 221. Elliptical goldenrod gall, Gnorimoschema gallaesolidaginis Riley. One gall in section. (Original)

Irregular, subglobose or fusiform, eccentric enlargement, length 2.5 cm, on S. rugosa. Fig. 219. Osten Sacken '62, p. 368

Itonid. Knotty goldenrod gall, Lasioptera solidaginis O. S (L. tumifica Beutm.)

Globose or subglobose, smooth, brownish and apical on either aerial or subterranean stems, diameter 2.5 cm, on S. juncea. Pl. 12, fig. 9. Felt '15i, p. 242

Itonid. Root stalk bud midge, Rhopalomyia hirtipes O. S.

Cylindric, apical bud gall on subterranean root stalk, length 6 mm, diameter 2.5 mm. Pl. 12, fig. 7. Felt '15i, p. 260
Itonid. Rhopalomyia bulbula Felt

Globular stem gall, diameter 2.5 cm, the interior pithy, with an oval cell in the center. Fig. 220. Stebb. '10, p. 51
Dipt. Goldenrod ball gall, Eurosta solidaginis Fitch

Oval, stem gall, length 1 cm, diameter 4 to 5 mm. Pl. 4, fig. 8. Stebb. '10, p. 51
Lepid. Scarred goldenrod gall, Eucosma scudderiana Clem.

Oval, stem gall on S. sempervirens. Busck '11, p. 4
Lepid. Gnorimoschema salinaris Busck

Gall just above or close to the ground, on S. rigida. Busck '15, p. 82
Lepid. Gnorimoschema gibsoniella Busck

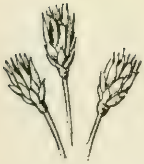

Fig. 222. Asphondylia chrysothamni Felt. Infested heads. (Original)

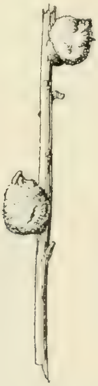

Fig. 223. Eurosta bigeloviae Ckll. (Original)

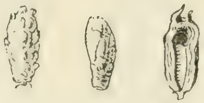

Fig. 224. Rhopalomyia utahensis Felt. Bud galls, one in section. (Original)

Fusiform, stem gall, length 3 mm, diameter 1.5 cm, usually near the ground, on Solidago latifolia, S. caesia and Aster divaricatus. Busck '11, p. 6
Lepid. Gnorimoschema gallaeasteriella Kellicott

Elongate, spindle-shaped, stem enlargement of S. canadensis. Fig 221. Stebb. '10, p. 51
Lepid. Elliptical goldenrod gall, Gnorimoschema gallaesolidaginis Riley

Ovoid, solitary or clustered, fleshy, bud galls on the root stalk, length 5 mm, diameter 3 mm. Pl. 13, fig. 4. Felt '15i, p. 257
Itonid. Rhopalomyia thompsoni Felt[1]

Cylindrical, hollow, budlike gall near the surface, length 2 cm, diameter .5 cm. Pl. 4, fig. 4. Stebb. '10, p. 52
Dipt. Eurosta reticulata Snow

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[1] Possibly a synonym of R. hirtipes.

Fusiform, subterranean, bud gall, length 2 to 3 cm. Pl. 4, fig. 5. Thomp. '15, p. 55

Dipt. Eutreta sparsa Wied.

Ovate potato-like root gall, monothalamous, length 20 to 25 mm, diameter 10 to 12 mm. Daecke '10, p. 341

On S. rugosa Dipt. Eurosta comma Wied.
On S. juncea Dipt. Eurosta elsa Daecke.

Bigelovia graveolens (rayless goldenrod)

Swollen or enlarged leaf buds composed of short, ovate, aborted, glumelike leaflets without a distinct central cell, length 5 to 6 mm, diameter 3 mm Fig. 222. Felt '16f, p. 178

Itonid. Asphondylia chrysothamni Felt

void, hypertrophied, monothalamous leaf buds, green or somewhat purplish externally with short, recurved, aborted leaflets covered with a thick, gray pubescence, length 10 to 11 mm, diameter 7 to 8 mm, two or three frequently confluent. Fig. 224. Felt '16f, p. 186

Itonid. Rhopalomyia utahensis Felt

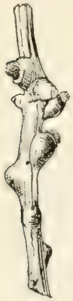

Fig. 225. Rhopalomyia bigelovioides Felt. Infested stem. (Original)

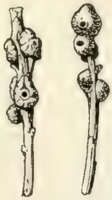

Fig. 226. Rhopalomyia glutinosa Felt. Two infested twigs. (Original)

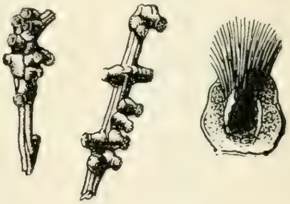

Fig. 227. Rhopalomyia chrysothamni Felt. Two infested twigs and one gall in section, enlarged. (Original)

Ovate, woolly, lateral bud gall, length 1 cm, diameter 7 cm. Fig. 223. Town. '93, p. 48

Dipt. Eurosta bigeloviae Ckll.
Dipt. Oedaspis atra Lw.

Oval, seed gall or an irregular, globose lateral bud swelling. Fig. 225. Felt '15i, p. 265

Itonid. Rhopalomyia bigelovioides Felt

A small, budlike gall. Felt '11j, p. 455

Itonid. Cecidomyia brassicoides Town.

Conelike, probably bud gall. Felt '11j, p. 455

Itonid. Dasyneura strobiloides Town.

Slightly swollen leaflet. Felt '16

Itonid. Asteromyia chrysothamni Felt

Globose or globe-shaped, polythalamous terminal twig enlargement, length 15 to 30 mm, diameter 12 to 20 mm. Fig. 235, 9. Beutm. '10a, p. 143

Cynipid. Aylax chrysothamni Beutm.

Hemispherical or subglobose, green, glabrous, cortical, stem swellings, becoming brown and resembling Lecaniums, diameter 3.5 mm, height 2 mm. Fig. 226. Felt '16f, p. 188

Itonid. Lecanoid gall, Rhopalomyia glutinosa Felt

Conical stem gall, length 4 mm, diameter 3 mm. Fig. 227. Felt '16f, p. 187

Itonid. Rhopalomyia chrysothamni Felt

Hollow, stem gall. Felt '15i, p. 276

Itonid. Rhopalomyia bigeloviae Ckll.

Cylindrical, brown, indistinctly ridged stem gall. Height 2 mm. Diameter. 1.25 mm. Stands at right angles to stem.

Itonid. Cecidomyia sp.

Reared from an oval, subcortical cell, length 2.5 mm, diameter 1 mm, showing practically no enlargement. Felt '16

Itonid. Asteromyia sp

Bigelovia plattensis (rayless goldenrod)

Globose, probably bud gall, diameter 5 to 6 mm.

Itonid. Cecidomyia sp.

Aster

Flower or bud galls

Aborted flower head of Aster patens. Osten Sacken '69, p. 299. Felt '16d, p. 127

Itonid. Nun midge, Asphondylia monacha O. S.

Dwarfed or stunted flower heads of Aster paniculatus. Felt '15i, p. 265

Itonid. Rhopalomyia asteriflorae Felt

Axillary bud gall, diameter 3–10 mm, on Aster lateriflorus. Pl. 13, fig. 1. Felt 15i, p. 247

Itonid. Rhopalomyia lateriflori Felt

Ovate, axillary bud gall, length 2 to 4 mm, diameter 2 mm, on A. undulatus. Pl. 13, fig. 3

Cecid. Rhopalomyia sp.

Blister leaf galls

Circular, yellowish white gall, diameter 2 to 3 mm, on Aster macrophyllus. Felt '09e, p. 287

Itonid. Lasioptera clarkei Felt

Narrowly oval, yellowish brown gall, length 4 mm, diameter 2 mm. Felt '09e, p. 286

Itonid. Asteromyia dumosae Felt

Circular, brownish, yellow-ringed gall, diameter 3 mm. Felt '09e, p. 286

Itonid. Asteromyia waldorfi Felt

Oval, yellowish, shining gall, diameter 6 to 7 mm. Felt '09e, p. 286

Itonid. Asteromyia nitida Felt

Large, oval, pinkish blotches, diameter 10 to 12 mm, on Aster divaricatus. Felt '08e, p. 330

Itonid. Asteromyia divaricata Felt

Irregularly oval, yellowish or brownish gall, diameter 6 mm, on Aster paniculatus. Felt '07a, p. 109

Itonid. Asteromyia paniculata Felt

Oval, blackish gall, diameter 4 mm, on A. undulata. Felt '11k, p. 481 A similar, possibly the same gall, occurs on Ionactis leariifolius. Pl. 5, fig. 7. Felt, '11j, p. 481

Itonid. Asteromyia reducta Felt

Oval, greenish yellow or papery white gall, diameter 1.75 cm, on Aster laevis. Felt '07a, p. 108

Itonid. Papery blister gall, Asteromyia laeviana Felt

Oval leaf gall, sooty yellow beneath, dirty white above, length 2 cm, diameter 1.2 cm. Felt '08e, p. 329

Itonid. Asteromyia flavomaculata Felt

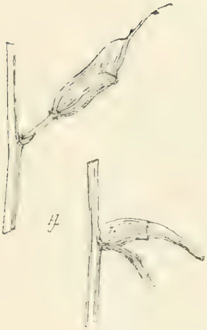

Fig. 228. Aster stem gall, Neolasioptera ramuscula Beutm. (Author's illustration)

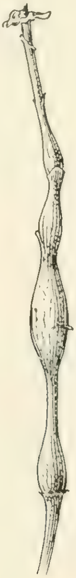

Fig. 229. Neolasioptera albitarsis Felt. A series of galls. (Original)

Circular, yellowish white, dark margined gall, diameter 3 mm, on Aster lateriflorus. Beutm. '07c, p. 395

Itonid. Asteromyia asterifoliae Beutm.

Oval, green swellings, length 2 mm, diameter 1.5 mm. Felt '09e, p. 286

Itonid. Asteromyia vesiculosa Felt

Circular, yellowish or brownish gall, diameter 3 to 4 mm, on Aster cordifolius. Can. Ent. 47:228

Itonid. Asteromyia sylvestris Felt

Stem or branch galls

Small, pustulate swellings on the stems, diameter 3 mm. Felt '08e, p. 328

Itonid. Asteromyia pustulata Felt

Oval twig gall, length 1.5 cm, on Aster novae-angliae. Felt '15i, p. 259

Itonid. Rhopalomyia astericaulis Felt

Fusiform stem or branch gall, length 1 cm, diameter .4 cm. Fig. 228. Beutm. '07c, p. 392

Itonid. Aster stem gall, Neolasioptera ramuscula Beutm.

Fusiform, greenish brown, irregular stem swelling at or near the base of the leaf, length 1 cm, diameter .6 cm, on Aster infirmus. Fig. 229. Felt '07a, p. 153

Itonid. Neolasioptera albitarsis Felt

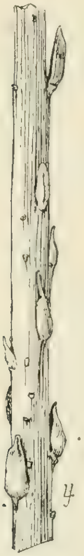
Fig. 230. Horseweed blister midge, Asteromyia modesta Felt. (Author's illustration)

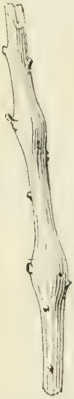
Fig. 231. Horseweed stem midge, Neolasioptera erigerontis Felt. (Original)

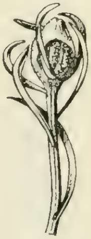
Fig. 232. Rhopalomyia erigerontis Felt. Typical gall. (Original)

Fusiform stem gall, length 2 cm, diameter 1 cm, on Aster umbellatus. Fyles '11, p. 135

Lepid. Gnorimoschema gallaediplopappi Fyles

Fusiform stem gall, length 3 cm, diameter 1.5 cm, usually near the ground, on Aster divaricatus, Solidago latifolia and S. caesia. Busck '11, p. 6

Lepid. Gnorimoschema gallaeasteriella Kell.

Spindle-shaped, stem or root galls, length 15 mm, diameter 6 to 8 mm, near or beneath the surface of the ground, on Aster multiflorus. Busck '11, p. 5

Lepid. Gnorimoschema subterranea Busck

Ovate, sessile, brownish, densely white-haired galls, length 7 mm, on Aster crassulus. Felt '15i, p. 237

Itonid. Rhopalomyia crassulina Ckll.

Acamptopappus spharocephalus

Gall-like swellings on tips of branches. Busck '03, p. 830

Lepid. Gnorimoschema octomaculella Chamb.

Erigeron canadensis (horseweed, butterweed)

Reared from a scarcely discolored, inconspicuous blister mine. Fig. 230. Felt '07a, p. 163

Itonid. Horseweed blister midge, Asteromyia modesta Felt

Fusiform stem gall, length 2 cm. Fig. 231. Felt '07a, p. 163

Itonid. Horseweed stem midge, Neolasioptera erigerontis Felt

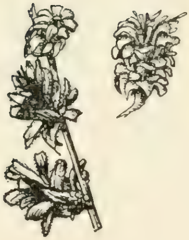

Fig. 233. Rhopalomyia ericameriae Felt. Typical rosette galls. (Original)

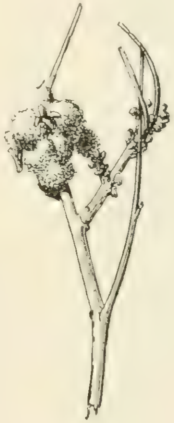

Fig. 234. Paradiplosis parthenicola Ckll. (Original)

Erigeron fragilis

Oval apical bud gall, length 10 mm, diameter 7 mm. Fig. 232. Felt '16f, p. 189

Itonid. Rhopalomyia erigerontis Felt

Sericocarpus asteroides (white-topped aster)

Apical, greenish bud gall. Felt '16d, p. 127

Itonid. ? Nun midge, Asphondylia monacha O. S. a2347

Baccharis pilularis (groundsel tree)

Flower bud or leaf gall, single or clustered, lobulate, greenish or reddish brown, diameter 5 mm to 1.5 cm. Felt '15i, p. 255

Itonid. Rhopalomyia californica Felt

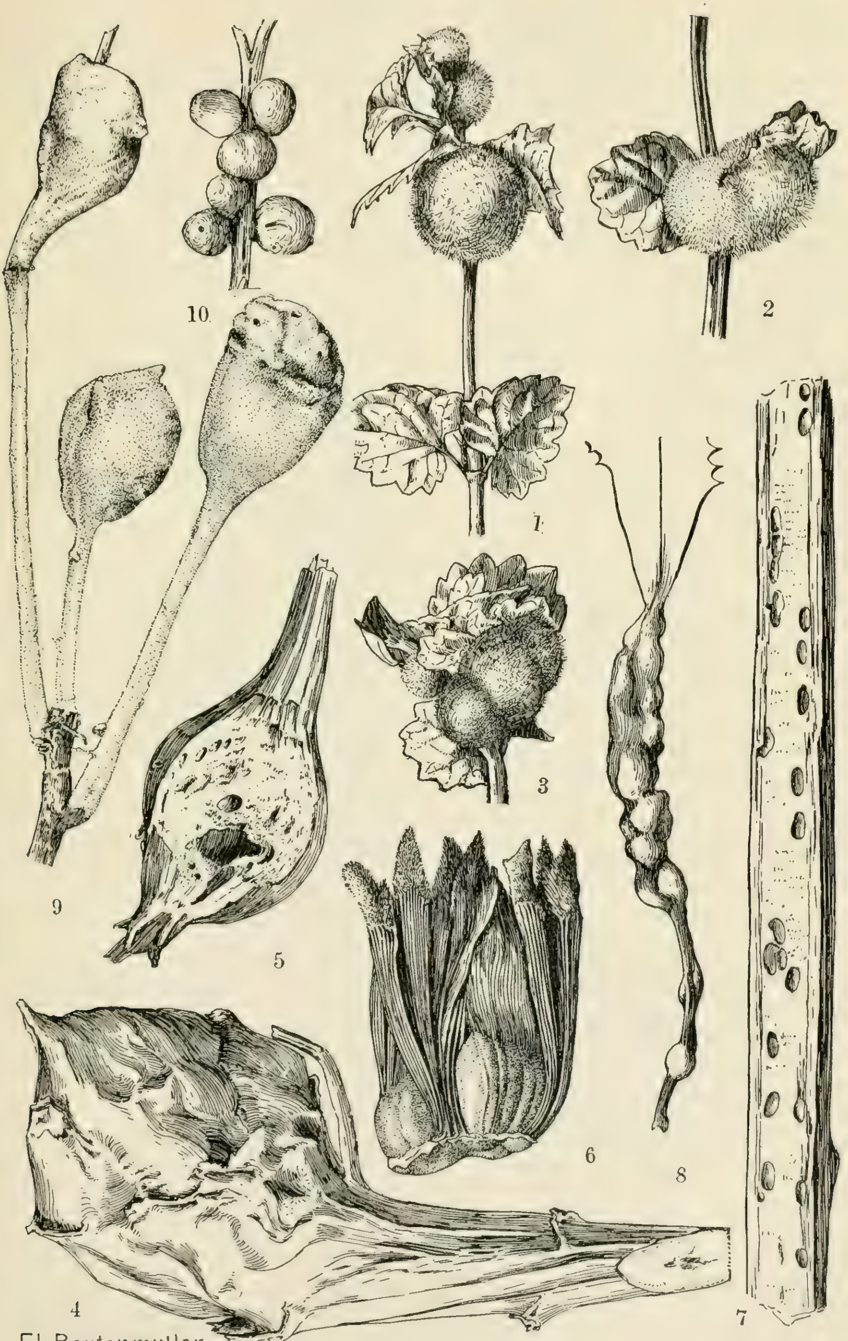

Fig. 235. Aylax galls. 1–3. Cat mint gall, A. glechomae Linn. 4, 5. Gall of rosin weed stem wasp, A. leavenworthi Bass. 6. Gall of rosin weed flower wasp, A. laciniatus Gill. 7. Gall of A. rufus Gill. 8. Gall of dandelion gall wasp, A. taraxaci Ashm. 9. Gall of A. chrysothamni Beutm. 10. Gall of A. pisum Walsh. (After Beutm., Am. Mus. Nat. Hist.)

Lobulate bud gall. Felt '11j, p. 455

Itonid. Rhopalomyia sp.

Globose, fleshy, terminal, polythalamous twig gall, diameter 7 to 12 mm. Felt '16

Itonid. Cecidomyia sp.

Stem gall. Felt '15i, p. 256

Itonid. Rhopalomyia baccharis Felt

Stem gall. Busck '03, p. 827

Lepid. Gnorimoschema baccharisella Busck

Ericameria

Small, rosette galls, the leaflets more or less recurved, really aborted branchlets and usually on the main stalk near the ground, length 12 mm, diameter 8 mm. Fig. 233. Felt '16f, p. 190

Itonid. Rhopalomyia ericameriae Felt

Antennaria (everlasting, ladies' tobacco)

Corm-shaped bud gall, the leaflets recurved, length 8 to 12 mm. Felt '16d, p. 133

Itonid. Everlasting bud midge, Asphondylia antennariae Whlr.

Elongate, oval bud galls, the leaflets scarcely recurved, length 3 to 5 mm. Felt '15i, p. 270

Itonid. Rhopalomyia antennariae Whlr.

Globose, white, woolly masses with white fibers 5 mm long radiating from hard, thin-shelled cells. Felt '15i, p. 266

Itonid. Woolly bud midge, Rhopalomyia pilosa Felt

Gnaphalium (cudweed)

Narrowly ovate, white, woolly bud gall

Itonid. Cudweed bud gall, Asphondylia sp. a2697

Silphium (rosinweed)

Ovate, frequently clustered, flower galls, length 4 to 5 mm. Fig. 235, 6. Beutm. '10a, p. 140

Cynipid. Rosinweed flower wasp, Aylax laciniatus Gill.

Irregular, apical, polythalamous, green, stem swellings, length 30 to 75 mm. Fig. 235, 4, 5. Beutm. '10a, p. 139

Cynipid. Rosinweed stem wasp, Aylax leavenworthi Bass.

Inhabiting oval cells in apparently normal stems. Fig. 235, 7. Beutm. '10a, p. 141

Cynipid. Aylax rufus Gill.
Aylax gillettei Kieff.

Parthenium

Woolly gall, diameter 5 mm. Fig. 234. Ckll. '00, p. 201

Itonid. Paradiplosis partheniicola Ckll.

Iva (related to I. axillaris)

Globular, pubescent, yellowish or greenish, pouch gall on the upper leaf surface, length 1.5 mm.

Acarid. Eriophyes sp. a2717

Ambrosia (ragweed)

Presumably from a stem gall, the latter possibly identical in appearance with that of a Lepidopteron. Beutm. '10b, p. 256

Cynipid. Ragweed stem wasp, Aulacidea ambrosiaecola Ashm.

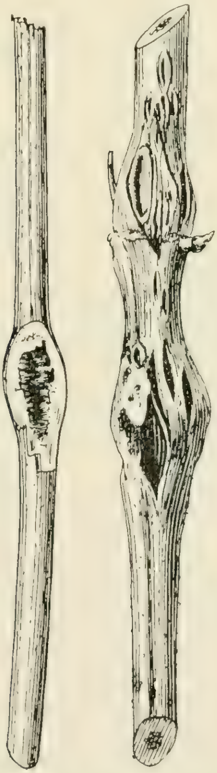

Fig. 236. Ragweed stem gall, Neolasioptera ambrosiae Felt. One gall in section. (Original)

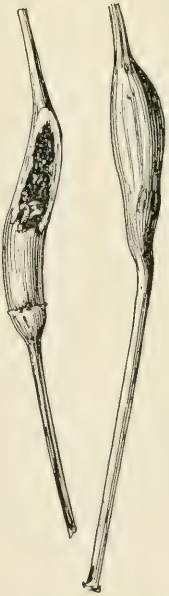

Fig. 237. Sunflower stem midge, Lasioptera weldi Felt. One gall partly in section. (Original)

Reared from stems of giant ragweed. Fig. 236. Felt '09e, p. 288

Itonid. Ragweed stem midge, Neolasioptera ambrosiae Felt

Rudbeckia (cone-flower)

Deformed, enlarged florets, the affected ones leafy. Beutm. '07c, p. 388

Itonid. Cecidomyia rudbeckiae Beutm.

Irregular, subglobular, apical, bud gall, diameter 4 cm. Pl. 5, fig. 2. Osten Sacken '71, p. 51. Felt '16d, p. 146

Itonid. Cone-flower gall, Asphondylia conspicua O. S.

Nodular, stem gall. Felt '11j, p. 468

Itonid. Cecidomyia sp.

Undetected gall, possibly from an apparently unmodified stem. Felt '08e, p. 324

Itonid. Cone-flower stem midge, Lasioptera rudbeckiae Felt

Lepachys

Deformed flower bud. Cook '04a, p. 116

Itonid. Cecidomyia sp.

Helianthus (sunflower)

Sunflower seeds apparently normal. Felt '09e, p. 288

Itonid. Sunflower seed midge, Lasioptera murtfeldtiana Felt

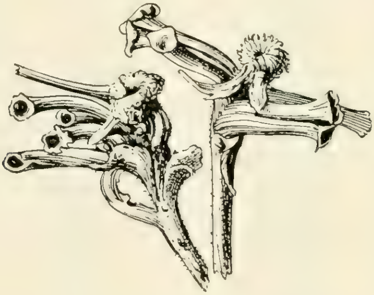

Fig. 238. Tubular bud gall, Hormomyia helianthi Brodie. (Original)

Subglobular leaf gall, diameter 6 to 7 mm. Pl. 10, fig. 5. Felt '14e, p. 286

Itonid. Sunflower bullet gall, Hormomyia bulla Felt

Globular or spherical, stem galls, diameter 1 to 4 cm. Pl. 5, fig. 3. Osten Sacken '69, p. 301. Felt '16d, p. 131

Itonid. Sunflower purse gall, Asphondylia globulus O. S.

Stem gall undescribed. Osten Sacken '71, p. 51. Felt '16d, p. 146

Itonid. Asphondylia conspicua O. S.

Stem gall, on H. divaricatus. Brodie '94, p. 73

Itonid. Cecidomyia thurstoni Brodie

Fusiform stem gall, length 3 cm, diameter .7 mm. Fig. 237. Felt '08e, p. 326

Itonid. Sunflower stem midge, Lasioptera weldi Felt

Stem gall undescribed. Felt '11k, p. 484

Itonid. Neolasioptera trimera Felt

Helianthus strumosus

Flower heads apparently unmodified. Felt '16, p. 120

Itonid. Asphondylia helianthiflorae Felt

Tubular, axillary bud gall, length 10 to 25 mm. Fig. 238. Felt '13d, p. 418
Itonid. Tubular bud gall, Hormomyia helianthi Brodie

Reared from undetected gall. Felt '07e, p. 7
Itonid. Neolasioptera helianthi Felt

Actinomeris alternifolia

Globose bud gall. Beutm. '07c, p. 391
Itonid. Cecidomyia ? verbesinae Beutm.

Helenium (sneezeweed)

Apical rosette gall, length 2 to 3 cm. Beutm. '07c, p. 383. Felt '16d, p. 137
Itonid. Asphondylia autumnalis Beutm.

Small stems with the pith tunneled by orange-colored larvae
Itonid. Cecidomyia sp. a274

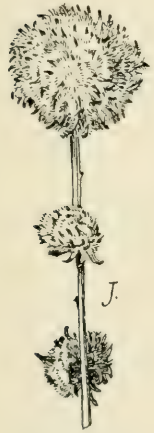

Fig. 239. Rhopalomyia alticola Ckll. (Author's illustration)

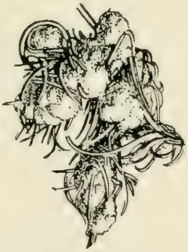

Fig. 240. Diarthronomyia floccosa Felt. (Original)

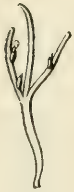

Fig. 241. Diarthronomyia californica Felt. Three galls. (Original)

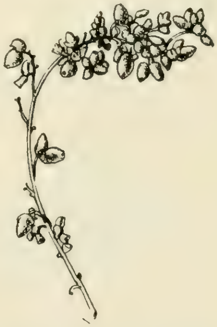

Fig. 242. Rhopalomyia betheliana Ckll. Cluster of galls. (Original)

Achillea (yarrow)

Florets apparently normal. Felt '08e, p. 333
Itonid. Yarrow flower midge, Clinorhyncha millefolii Wachtl.

Irregularly oval, flower bud gall with a whitish pubescence, length 7 mm.
Itonid. ? Rhopalomyia millefolii H. Lw.

Anthemis (chamomile)

Larvae in flower heads. Felt '11j, p. 453
Itonid. Cecidomyia sp.

Chrysanthemum

Swollen stems, leaf stalks or deformed buds containing oval, frequently coalescent cells with a length about 2 mm. Pl. 10, fig. 4. Felt '16d, p. 51

Itonid. Chrysanthemum midge, Diarthronomyia hypogaea H. Lw.

Artemisia californica

Irregular, lobulate, woolly masses apparently arising from lateral buds and frequently confluent; individual galls with a diameter of about 4 mm. Fig. 240. Felt '16f, p. 195

Itonid. Diarthronomyia floccosa Felt

Subconical, thin-walled, obliquely set, brownish or reddish leaf gall, length 1.5 mm, diameter .5 mm. Fig. 241. Felt '12j, p. 193

Itonid. Diarthronomyia californica Felt

Artemisia caudata

Oval, woolly, apical or lateral bud galls, diameter 1 to 1.5 cm, consisting of a series of oval cells with a length of about 2 mm and with numerous long fibers. Felt '15i, p. 272

Itonid. Woolly wormwood gall, Rhopalomyia ?alticola Ckll.

Artemisia forwoodii (?canadensis)

Globular, woolly galls, diameter about 1 cm. Fig. 239. Felt '15i, p. 272

Itonid. Woolly wormwood gall, Rhopalomyia alticola Ckll.

Artemisia frigida

Fusiform, flower or leaf bud galls, length 4 mm, also on A. filifera. Fig. 242. Felt '15i, p. 238

Itonid. Rhopalomyia betheliana Ckll.

Artemisia gnaphalodes

Irregular, lobulate, polythalamous, white, pubescent gall, diameter 1 cm. Felt '11k, p. 484

Itonid. Rhopalomyia gnaphalodis Felt

Artemisia heterophylla

Ovate, thin-walled, oblique leaf galls, length 1 mm, also breeds in apparently normal flower buds. Fig. 244. Felt '16f, p. 194

Itonid. Diarthronomyia occidentalis Felt

Artemisia species (wormwood)

Deformed flower heads, length 10 mm, diameter 5 to 6 mm. Felt '11j, p. 453

Itonid. Wormwood flower midge, Rhopalomyia coloradella Ckll.

Bud galls, presumably. Felt '16d, p. 133

Itonid. Asphondylia artemisiae Felt

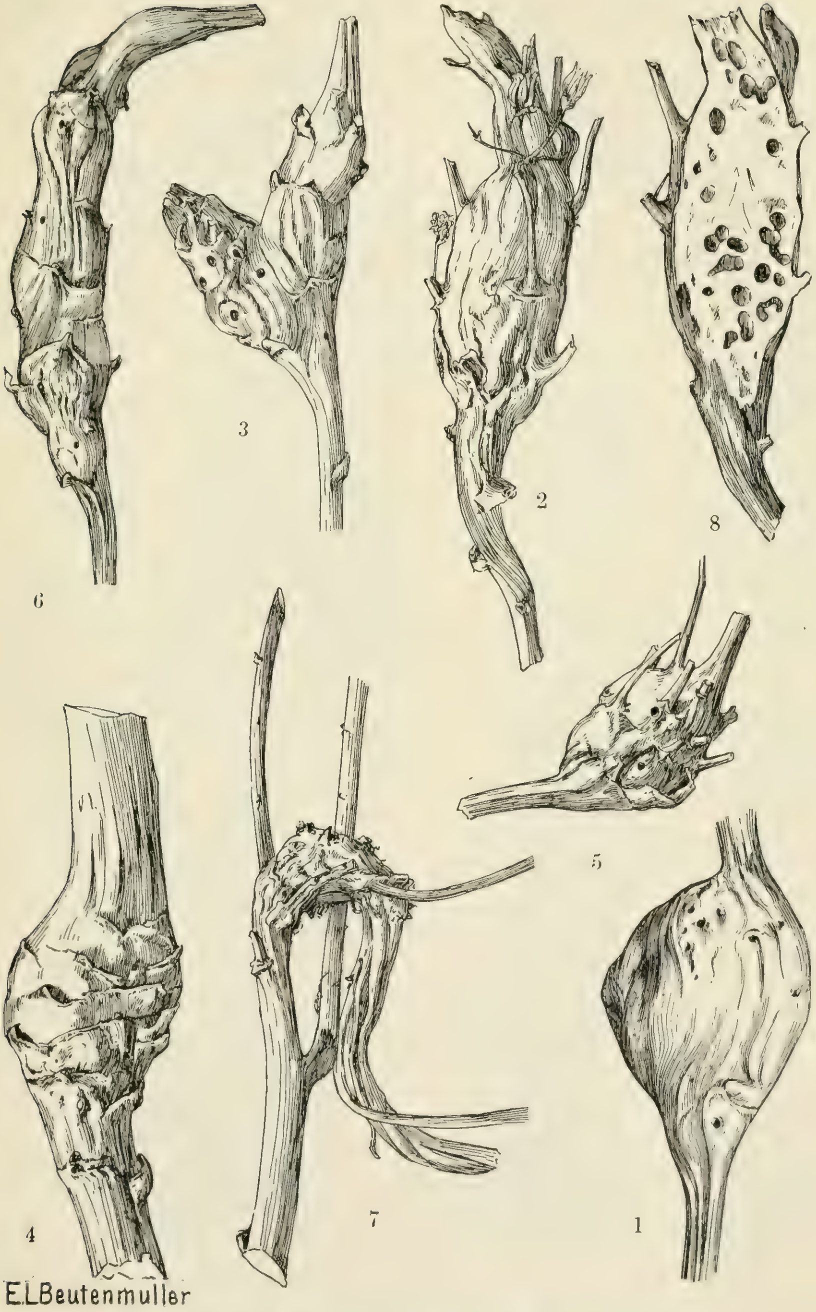

Fig. 243. Lettuce tumor gall, Aulacidea tumida Bass. 1–8 showing various types. (After Beutm., Am. Mus. Nat. Hist.)

A bud deformation of black, globose or densely-crowded filaments. Chadwick '08, p. 127

Acarid. Eriophyes sp.

Ovate masses of linear, modified leaves occurring on the branchlets of a species of Artemisia, length of mass 1.5 cm, diameter 5 to 7 cm.

Acarid. Eriophyes sp., a2733

Subconical, short-wooled, yellowish gray, axillary bud gall, length 2 cm, diameter 1 cm. (Collected by L. H. Weld)

Dipt. Trypetid a2774

Globose, axillary, woolly bud gall, diameter 7 to 10 mm, the hairs grayish white, short and thick. (Collected by L. H. Weld)

Dipt. Trypetid a2773

Artemisia tridentata (sage bush)

Oval, budlike, flower gall the size of a pea. Felt '15i, p. 271

Itonid. Rhopalomyia tridentatae Rubs.

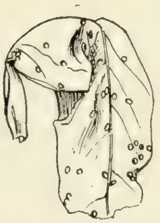

Fig. 244. Diarthronomyia occidentalis Felt. Galls on A. heterophylla. (Original)

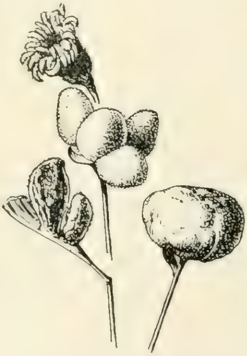

Fig. 245. Diarthronomyia artemisiae Felt. Several types of spongy gall, one in section. (Original)

Ovate, hard, thick-walled, yellowish brown bud gall, length 1.5 cm, diameter .8 cm. (Collected by L. H. Weld)

Dipt. Trypetid a2775

Flask-shaped leaf gall, length 4 mm, diameter 2 mm. Fig. 247. Felt '16f, p. 185

Itonid. Wormwood flask gall, Rhopalomyia ampullaria Felt

Oval, grayish or almost black, solitary or clustered gall on the under side of the leaves, length 1.5 cm. Fig. 248. Felt '16f, p. 194

Itonid. Diarthronomyia occidentalis Felt

Globose, variable, monothalamous or polythalamous leaf bud or rosette galls, or a bladdery gall arising from the leaf, pubescence variable, dimensions 3 to 15 mm. Fig. 245. Felt '16f, p. 193

Itonid. Diarthronomyia artemisiae Felt

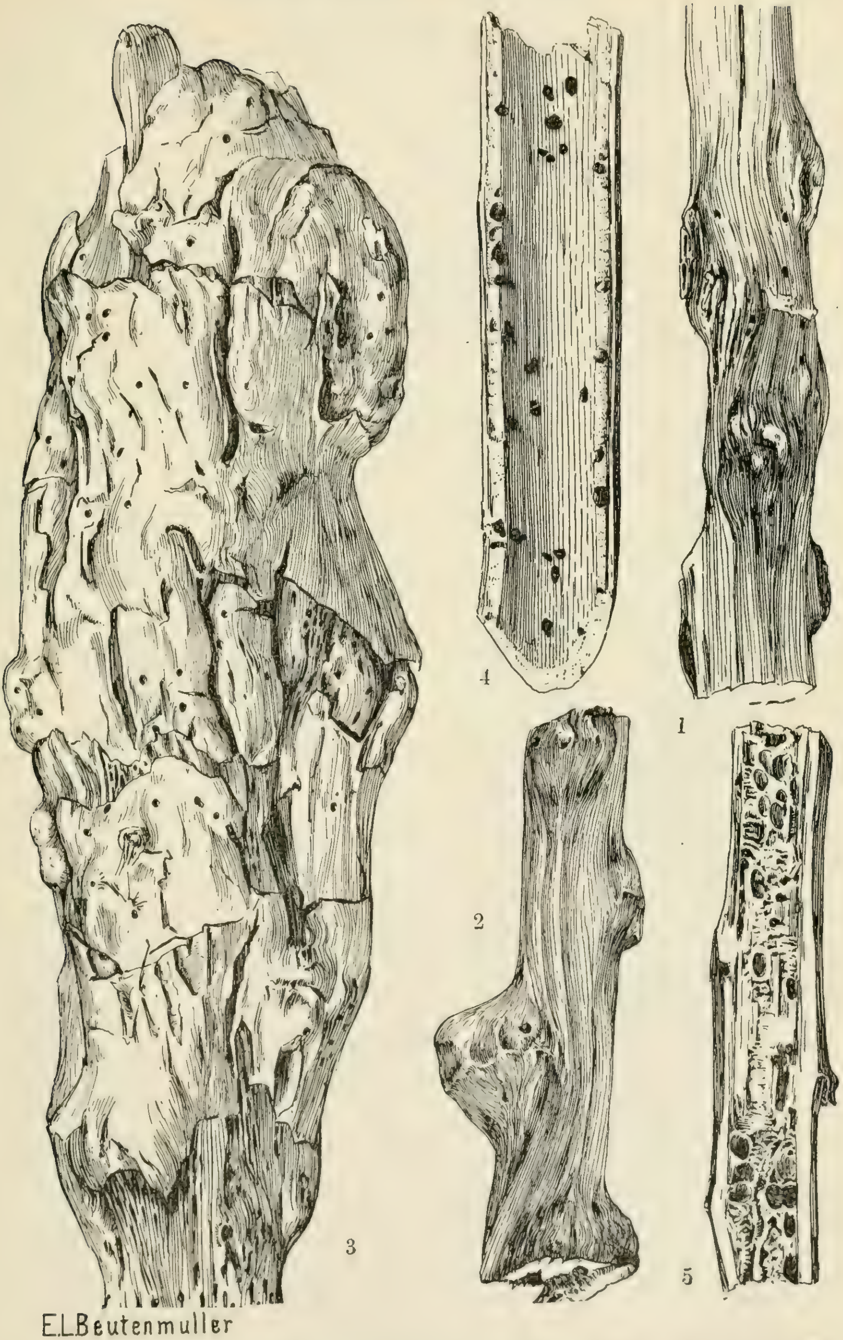

Fig. 246. Wild lettuce galls. 1–4. Aulacidea podagrae Bass. 5. A. bicolor Bass. (After Beutm., Am. Mus. Nat. Hist.)

Subglobular, brown, spongy, apical gall, diameter 1.8 cm, possibly identical with the preceding. Felt '11j, p. 453

Itonid. Cecidomyia sp.

Senecio (groundsel, ragwort, squaw-weed)

Flower heads, presumably unmodified. Felt '15i, p. 237

Itonid. Rhopalomyia cockerelli Felt

Stem gall undescribed. Felt '11k, p. 482

Itonid. Lasioptera arizonensis Felt

Tetradymia spinosa (salt bush)

Fusiform, woolly, hollow stem enlargement, length 3 cm. diameter 1 cm. Busck '03, p. 834

Lepid. Gnorimoschema ? tetradymiella Busck

Arctium (burdock)

Yellowish larvae in burs. Felt '11j, p. 453

Itonid. Cecidomyia sp.

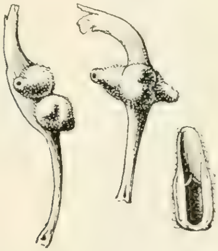

Fig. 247. Wormwood flask gall, Rhopalomyia ampullaria Felt. Two clusters of gall, one in section, the last enlarged. (Original)

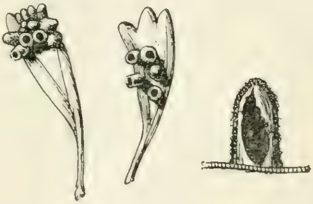

Fig. 248. Diarthronomyia occidentalis Felt. Gall on A. tridentata, one in section, much enlarged. (Original)

Taraxacum (dandelion)

Oblong, irregular, polythalamous, petiole or midrib swellings, length 25 to 50 mm. Fig. 235, 8. Beutm. '10a, p. 142

Cynipid. Dandelion gall wasp, Aylax taraxaci Ashm.

Lactuca (lettuce)

Irregular stem gall, diameter 1.75 cm. Felt '07a, p. 151

Itonid. Lettuce stem midge, Lasioptera lactucae Felt

Rounded, elongate, irregular, polythalamous, stem swelling, length 25 to 75 mm. Fig. 243. Beutm. '10b, p. 253

Cynipid. Lettuce tumor gall, Aulacidea tumida Bass.

Occurring in the pith, sometimes causing a stem swelling. Fig. 246, 1–4, pl. 3, fig. 6. Beutm. '10b, p. 254

Cynipid. Aulacidea podagrae Bass.

Occurring in thin-walled cells in the pith of the stem. Fig. 246, 5. Beutm. '10b, p. 255

Cynipid. Aulacidea bicolor Bass.

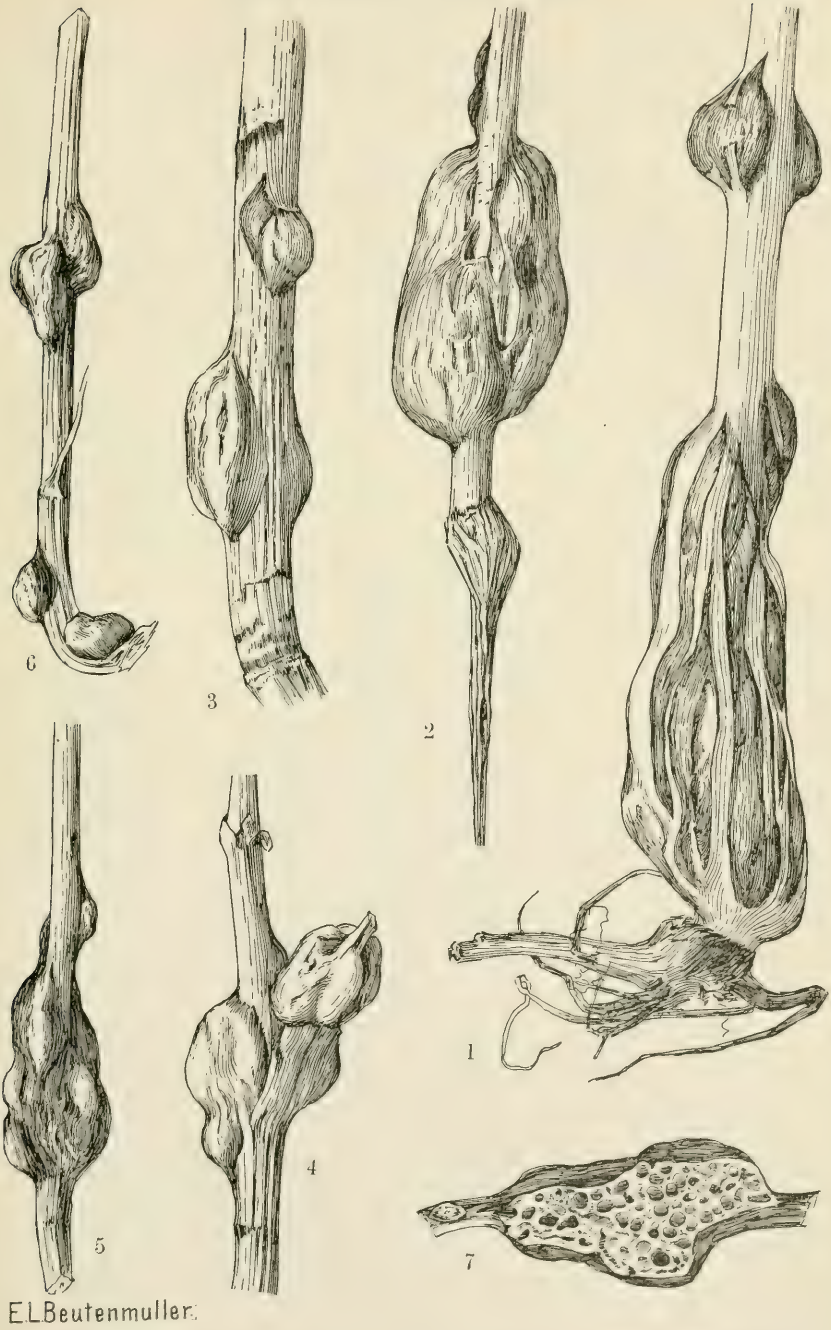

Fig. 249. Rattlesnake root gall, Aulacidea nabali Brodie. 1–7 showing various types of the gall. (After Beutm., Am. Mus. Nat. Hist.)

Sonchus (sow thistle)

Reared from stems. Ashm. '97e, p. 134

Cynipid. Lettuce tumor gall, Aulacidea tumida Bass.

Encelia

Leaf bud gall, length 10 mm, diameter 4 mm. Felt '12e, p. 152

Itonid. Asphondylia enceliae Felt

Conical, thick-walled, lateral bud gall, length 6 mm, diameter 3 mm, frequently confluent basally, sometimes twisting the stem and producing a marked deformation. Felt '16f, p. 183

Itonid. Rhopalomyia enceliae Felt

Lygodesmia

Oval or pea-like, monothalamous stem galls, diameter 5 to 12 mm. Fig. 235, 10. Beutm. '10a, p. 142

Cynipid. Aylax pisum Walsh

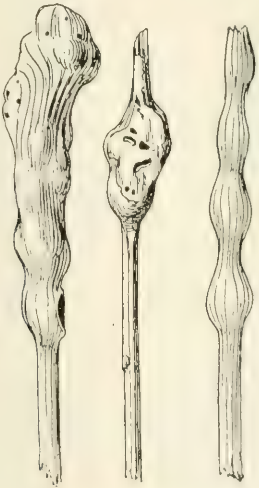

Fig. 250. Lasioptera palustris Felt. A group of galls, one sectioned. (Original)

Prenanthes (rattlesnake-root)

Flat, purplish leaf gall, length 2 to 3 mm. Felt '13d, p. 417

Itonid. Cystiphora canadensis Felt

Irregular, polythalamous, basal, stem swelling somewhat resembling small, knotty artichokes, diameter 5 to 10 mm. Fig. 249. Beutm. '10b, p. 256

Cynipid. Aulacidea nabali Brodie

American Insect Galls

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Polypodiaceae								
Cystopteris								
Cecidomyia	1							
Ephedraceae								
Ephedra								
Lasioptera	2							
Pinaceae	*38*	*2*	*1*		*3*	*1*		*2*
Pinus								
Cecidomyia	5							
Chermes					1			
Contarinia	1							
Dicrodiplosis	1							
Janetiella	1							
Monardia	2							
Mycodiplosis	1							
Podapion			1					
Retinodiplosis	6							
Thecodiplosis	1							
Winnertzia	1							
Picea								
Chermes					3			
Abies								
Cecidomyia	1							
Dasyneura	1							
Phytophaga	1							
Rhabdophaga	1							
Taxodium								
Itonida	2							
Thecodiplosis	1							
Retinodiplosis	1							
Chamaecyparis								
Cecidomyia	1							
Janetiella	1							
Thuja								
Eriophyes								1
Rhopalomyia	1							
Tsuga								
Camptomyia	1							
Juniperus								
Allomyia	1							
Arthrocnodax	1							
Cecidomyia	2							
Chalcid						1		
Cynipid		2						
Eriophyes								1
Oligotrophus	1							
Walshomyia	1							
Sabina								
Walshomyia	1							
Gramineae	*33*			*4*		*21*		*2*
Triticum								
Cecidomyia	2							
Cephus						2		
Chlorops				1				
Isosoma						3		
Itonida	1							
Lestodiplosis	1							
Lestremia	1							
Oscinis				1				
Phytophaga	1							
Prodiplosis	1							
Thecodiplosis	1							
Eriocoma								
Isosoma						1		
Tripsacum								
Lasioptera	1							
Sorghum								
Contarinia	1							

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Sorghastrum								
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Digitaria								
Chlorops	.....	.....	.....	1	.....	.....	.....	.....
Panicum								
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Echinochloa								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Setaria								
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Aristida								
Siteroptes	.....	.....	.....	.....	.....	.....	.....	1
Muhlenbergia								
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Chlorops	.....	.....	.....	1	.....	.....	.....	.....
Isosomorpha	.....	.....	.....	.....	.....	1	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Phleum								
Cephus	.....	.....	.....	.....	.....	1	.....	.....
Alopecurus								
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Sporobolus								
Siteroptes	.....	.....	.....	.....	.....	.....	.....	1
Agrostis								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Isosoma	.....	.....	.....	.....	.....	1	.....	.....
Avena								
Coquillettomyia	1	.....	.....	.....	.....	.....	.....	.....
Mycodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Prionellus	1	.....	.....	.....	.....	.....	.....	.....
Danthonia								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Tridens								
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Eurytomocharis	.....	.....	.....	.....	.....	1	.....	.....
Eragrostis								
Eurytomocharis	.....	.....	.....	.....	.....	1	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Distichlis								
Anthracophaga	.....	.....	.....	1	.....	.....	.....	.....
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Siteroptes	.....	.....	.....	.....	.....	.....	.....	1
Poa								
Colpodia	2	.....	.....	.....	.....	.....	.....	.....
Isosoma	.....	.....	.....	.....	.....	2	.....	.....
Bromus								
Cephus	.....	.....	.....	.....	.....	1	.....	.....
Isosoma	.....	.....	.....	.....	.....	2	.....	.....
Agropyron								
Cephus	.....	.....	.....	.....	.....	1	.....	.....
Isosoma	.....	.....	.....	.....	.....	2	.....	.....
Phytophaga	1	.....	.....	.....	.....	.....	.....	.....
Hordeum								
Isosoma	.....	.....	.....	.....	.....	1	.....	.....
Phytophaga	1	.....	.....	.....	.....	.....	.....	.....
Secale								
Isosoma	.....	.....	.....	.....	.....	2	.....	.....
Elymus								
Cephus	.....	.....	.....	.....	.....	1	.....	.....
Isosoma	.....	.....	.....	.....	.....	2	.....	.....
Phytophaga	1	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....
Cyperaceae	*4*	.....	.....	.....	.....	.....	.....	.....
Cyperus								
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Dulichium								
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Thecodiplosis	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Scirpus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Juncaceae								
Juncus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Livia	.....	.....	.....	.....	1	.....	.....	.....
Liliaceae	*11*	*1*	.....	.....	.....	.....	.....	.....
Oakesia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Yucca								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Smilacina								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Maianthemum								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Polygonatum								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Smilax								
Camptoneuromyia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Diastrophus	.....	1	.....	.....	.....	.....	.....	.....
Dioscoreaceae								
Dioscorea								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Iridaceae								
Iris								
Agromyza	.....	.....	.....	1	.....	.....	.....	.....
Orchidaceae								
Cattleya								
Isosoma	.....	.....	.....	.....	.....	1	.....	.....
Parallelodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Salicaceae	*66*	.....	*5*	*6*	.....	*14*	*1*	*23*
Salix								
Acarus	.....	.....	.....	.....	.....	.....	.....	1
Agrilus	.....	.....	1	.....	.....	.....	.....	.....
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Asynapta	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Clinorhyncha	1	.....	.....	.....	.....	.....	.....	.....
Cryptorhynchus	.....	.....	1	.....	.....	.....	.....	.....
Dasyneura	8	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	13
Euura	.....	.....	.....	.....	.....	9	.....	.....
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Oligotrophus	1	.....	.....	.....	.....	.....	.....	.....
Pontania	.....	.....	.....	.....	.....	5	.....	.....
Phytophaga	9	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	23	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Sackenomyia	2	.....	.....	.....	.....	.....	.....	.....
Saperda	.....	.....	1	.....	.....	.....	.....	.....
Populus								
Agromyza	.....	.....	.....	1	.....	.....	.....	.....
Cecidomyia	7	.....	.....	.....	.....	.....	.....	.....
Cryptorhynchus	.....	.....	1	.....	.....	.....	.....	.....
Dicrodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Ectoedemia	.....	.....	.....	.....	.....	.....	1	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	9
Kronomyia	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Pemphigus	.....	.....	.....	.....	6	.....	.....	.....
Mycodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....
Rhizomyia	1	.....	.....	.....	.....	.....	.....	.....
Saperda	.....	.....	1	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Myricaceae								
Myrica								
Cecidomyia	1							
Eriophyes								1
Janetiella	1							
Juglandaceae	29				29			7
Juglans								
Cecidomyia	1							
Eriophyes								4
Carya								
Caryomyia	20							
Cecidomyia	4							
Eriophyes								3
Miastor	1							
Mycodiplosis	1							
Parallelodiplosis	1							
Phylloxera					29			
Rhabdophaga	1							
Betulaceae	11		3		2			18
Corylus								
Agrilus			1					
Cecidomyia	1							
Eriophyes								1
Lasiopteryx	1							
Mycodiplosis	1							
Ostrya								
Cecidomyia	1							
Eriophyes								1
Carpinus								
Cecidomyia	1							
Betula								
Agrilus			1					
Eriophyes								10
Hamamelistes					1			
Hormaphis					1			
Itonida	1							
Lestodiplosis	1							
Miastor	1							
Mycodiplosis	1							
Oligotrophus	1							
Alnus								
Eriophyes								6
Dasyneura	1							
Saperda			1					
Fagaceae	43	359						17
Fagus								
Eriophyes								4
Castanea								
Cecidomyia	2							
Ectoedemia							1	
Eriophyes								1
Itonida	1							
Janetiella	1							
Miastor	1							
Rhopalomyia	1							
Winnertzia	1							
Castanopsis								
Andricus		1						
Quercus								
Amphibolips		26						
Andricus		114						
Bassettia		1						
Biorhiza		5						
Blenocnema		1						
Callirhytis		41						
Cecidomyia	11							
Cincticornia	12							
Compsodryoxenus		2						
Cynips		36						
Dasyneura	2							

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Dicrodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Disholcaspis	.....	27	.....	.....	.....	.....	.....	.....
Dolichostrophus	.....	1	.....	.....	.....	.....	.....	.....
Dryocosmus	.....	1	.....	.....	.....	.....	.....	.....
Dryophanta	.....	41	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	12
Eumayria	.....	1	.....	.....	.....	.....	.....	.....
Itonida	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Loxaulus	.....	3	.....	.....	.....	.....	.....	.....
Leptosyna	1	.....	.....	.....	.....	.....	.....	.....
Miastor	1	.....	.....	.....	.....	.....	.....	.....
Neuroterus	.....	47	.....	.....	.....	.....	.....	.....
Odontocynips	.....	1	.....	.....	.....	.....	.....	.....
Parallelodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Philonix	.....	13	.....	.....	.....	.....	.....	.....
Thecodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Trichoteras	.....	1	.....	.....	.....	.....	.....	.....
Trigonaspis	.....	2	.....	.....	.....	.....	.....	.....
Xystoteras	.....	1	.....	.....	.....	.....	.....	.....
Youngomyia	1	.....	.....	.....	.....	.....	.....	.....
Zopheroteras	.....	1	.....	.....	.....	.....	.....	.....
Urticaceae	*18*	.....	.....	.....	*14*	.....	.....	*5*
Ulmus								
Colopha	.....	.....	.....	.....	1	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	4
Oligarces	1	.....	.....	.....	.....	.....	.....	.....
Pemphigus	.....	.....	.....	.....	1	.....	.....	.....
Phytophaga	2	.....	.....	.....	.....	.....	.....	.....
Tetraneura	.....	.....	.....	.....	1	.....	.....	.....
Schizoneura	.....	.....	.....	.....	2	.....	.....	.....
Celtis								
Cecidomyia	7	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Pachypsylla	.....	.....	.....	.....	9	.....	.....	.....
Phytophaga	2	.....	.....	.....	.....	.....	.....	.....
Humulus								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Urtica								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Laportea								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Boehmeria								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Aristolochiaceae								
Aristolochia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Polygonaceae	*5*	.....	.....	.....	.....	.....	.....	.....
Eriogonum								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Rumex								
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Coccolobis								
Ctenodactylomyia	1	.....	.....	.....	.....	.....	.....	.....
Chenopodiaceae	*7*	.....	.....	.....	*2*	.....	.....	.....
Eurotia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Atriplex								
Asphondylia	2	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Coccid	.....	.....	.....	.....	2	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Sarcobatus								
Aplonyx	1	.....	.....	.....	.....	.....	.....	.....
Onodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Protaplonyx	1	.....	.....	.....	.....	.....	.....	.....
Trypetid	.....	.....	.....	1	.....	.....	.....	.....
Suaeda								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Phytolaccaceae								
Rivina								
Schizomyia	1	.....	.....	.....	.....	.....	.....	.....
Nyctaginaceae								
Oxybaphus								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Pisonia								
Feltomyia	3	.....	.....	.....	.....	.....	.....	.....
Ranunculaceae	9	.....	.....	1	.....	.....	.....	2
Thalictrum								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Trotteria	1	.....	.....	.....	.....	.....	.....	.....
Anemone								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Clematis								
Agromyza	.....	.....	.....	1	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Prodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Paeonia								
Joannisia	1	.....	.....	.....	.....	.....	.....	.....
Magnoliaceae								
Liriodendron								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Thecodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Lauraceae								
Sassafras								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Benzoin								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Papaveraceae								
Papaver								
Clinodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Cruciferae								
Lepidium								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Sisymbrium								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Stanleya								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Capparidaceae								
Cleome								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Crassulaceae								
Clementsia	.....	.....	.....	.....	.....	.....	.....	1
Saxifragaceae								
Hydrangea								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Ribes								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Phytophaga	1	.....	.....	.....	.....	.....	.....	.....
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Hamamelidaceae								
Hamamelis								
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Hormaphis	.....	.....	.....	.....	1	.....	.....	.....
Liquidambar								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Platanaceae								
Platanus								
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Rosaceae	56	38	5	.....	.....	4	.....	27
Exochorda								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Spiraea								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Itonida	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Parallelodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Prodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....
Pyrus								
Agrilus	.....	.....	1	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	3
Syntomaspis	.....	.....	.....	.....	.....	1	.....	.....
Cercocarpus								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Aronia								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Amelanchier								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	2
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Sorbus								
Eriophyes	.....	.....	.....	.....	.....	1	.....	2
Megastigmus	.....	.....	.....	.....	.....	1	.....	.....
Syntomaspis	.....	.....	.....	.....	.....	.....	.....	.....
Crataegus								
Agrilus	.....	.....	1	.....	.....	.....	.....	.....
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	4
Hormomyia	1	.....	.....	.....	.....	.....	.....	.....
Dicrodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Lobopteromyia	1	.....	.....	.....	.....	.....	.....	.....
Rhizomyia	2	.....	.....	.....	.....	.....	.....	.....
Saperda	.....	.....	1	.....	.....	.....	.....	.....
Winnertzia	1	.....	.....	.....	.....	.....	.....	.....
Cotoneaster								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Fragaria								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Diastrophus	.....	1	.....	.....	.....	.....	.....	.....
Potentilla								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Diastrophus	.....	2	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Gonaspis	.....	1	.....	.....	.....	.....	.....	.....
Rubus								
Agrilus	.....	.....	1	.....	.....	.....	.....	.....
Camptoneuromyia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Diastrophus	.....	6	.....	.....	.....	.....	.....	.....
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Oberea	.....	.....	1	.....	.....	.....	.....	.....
Rhodites	.....	2	.....	.....	.....	.....	.....	.....
Agrimonia								
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Rosa								
Aphidoletes	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	2	.....	.....	.....	.....	.....	.....	.....
Rhabdophaga	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Rhodites	.....	28	.....	.....	.....	.....	.....	.....
Megastigmus	.....	.....	.....	.....	.....	1	.....	.....
Amygdalus								
Phyllocoptes	.....	.....	.....	.....	.....	.....	.....	1
Prunus								
Arthrocnodax	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	5	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	10
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Mycodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Parallelodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rhizomyia	1	.....	.....	.....	.....	.....	.....	.....
Adenostoma								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Leguminosae	*24*	.....	.....	.....	.....	.....	*1*	.....
Prosopis								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Gleditsia								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Cassia								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Thermopsis								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Crotalaria								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Genista								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Lupinus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Trifolium								
Dasyneura	2	.....	.....	.....	.....	.....	.....	.....
Medicago								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Robinia								
Ecdytolopha	.....	.....	.....	.....	.....	.....	1	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Obolodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Desmodium								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lespedeza								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Lathyrus								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Amphicarpa								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Geraniaceae								
Geranium								
Cecidomyia	1	.....	.....		.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Zygophyllaceae								
Covillea								
Asphondylia	2	.....	.....	.....	.....	.....	.....	.....
Rutaceae								
Citrus								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Phyllocoptes	.....	.....	.....	.....	.....	.....	.....	2
Euphorbiaceae	*5*	.....	.....	.....	.....	.....	.....	*1*
Manihot								
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Lasiopteryx	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Acalypha								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Phyllanthus								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Euphorbia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Buxaceae								
Buxus								
Monarthropalpus	1	.....	.....	.....	.....	.....	.....	.....
Anacardiaceae	*7*	.....	.....	.....	*1*	*1*	.....	*3*
Mangifera								
Asynapta	1	.....	.....	.....	.....	.....	.....	.....
Erosomyia	1	.....	.....	.....	.....	.....	.....	.....
Rhus								
Arthrocnodax	1	.....	.....	.....	.....	.....	.....	.....
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	3
Eurytoma	.....	.....	.....	.....	1	.....	.....	.....
Parallelodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Pemphigus	.....	.....	.....	.....	1	.....	.....	.....
Aquifoliaceae								
Nemopanthus								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Celastraceae								
Pachistima								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Celastrus								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Aceraceae	*13*	.....	.....	.....	.....	.....	*1*	*34*
Acer								
Anthocoptes	.....	.....	.....	.....	.....	.....	.....	1
Cecidomyia	3	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	3	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	20
Lestodiplosis	2	.....	.....	.....	.....	.....	.....	.....
Miastor	1	.....	.....	.....	.....	.....	.....	.....
Phyllocoptes	.....	.....	.....	.....	.....	.....	.....	13
Rhabdophaga	2	.....	.....	.....	.....	.....	.....	.....
Sesia	.....	.....	.....	.....	.....	.....	1	.....
Winnertzia	1	.....	.....	.....	.....	.....	.....	.....
Balsaminaceae								
Impatiens								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Lasioptera	2	.....	.....	.....	.....	.....	.....	.....
Mycodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Rhamnaceae								
Ceanothus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Stagmatophora	.....	.....	.....	.....	.....	.....	1	.....
Vitaceae	*22*	.....	*1*	.....	*1*	*3*	*1*	*7*
Psedera								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Prodecatoma	.....	.....	.....	.....	.....	1	.....	.....
Vitis								
Ampeloglypter	.....	.....	1	.....	.....	.....	.....	.....
Asteromyia	1	.....	.....	.....	.....	.....	.....	.....
Brachyneura	1	.....	.....	.....	.....	.....	.....	.....
Cecidomyia	4	.....	.....	.....	.....	.....	.....	.....
Coleophora	.....	.....	.....	.....	.....	.....	1	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Decatomidea	.....	.....	.....	.....	.....	1	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	6

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Evoxysoma						1		
Janetiella	1							
Lasioptera	2							
Lasiopteryx	1							
Lestodiplosis	1							
Neolasioptera	1							
Phylloxera					1			
Rhabdophaga	1							
Rhizomyia	1							
Schizomyia	3							
Cissus								
Astrodiplosis	1							
Tiliaceae								
Tilia								
Agromyza				1				
Cecidomyia	2							
Colpodia	1							
Eriophyes								1
Porricondyla	1							
Malvaceae								
Gossypium								
Arthrocnodax	1							
Cecidomyia	1							
Contarinia	1							
Porricondyla	1							
Eriophyes								1
Hibiscus								
Neolasioptera	1							
Hypericaceae								
Hypericum								
Cecidomyia	1							
Dasyneura	1							
Eriophyes								1
Lasioptera	1							
Violaceae								
Viola								
Arthrocnodax	1							
Dasyneura	1							
Phytophaga	1							
Loasaceae								
Mentzelia								
Asphondylia	1							
Cactaceae								
Optunia								
Asphondylia	3							
Itonida	1							
Elaeagnaceae								
Shepherdia								
Asphondylia	1							
Lythraceae								
Decodon								
Dasyneura	1							
Myrtaceae								
Eugenia								
Cystodiplosis	1							
Dasyneura	1							
Onagraceae								
Zauschneria								
Thecodiplosis	1							
Umbelliferae								
Cicuta								
Cecidomyia	1							
Zizia								
Lasioptera	1							
Cornaceae	*9*							*3*
Garrya								
Asphondylia	1							
Cornus								
Cecidomyia	2							
Eriophyes								1
Lasioptera	2							
Neolasioptera	1							

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Nyssa								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	
Ericaceae								
Rhododendron								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Gaylussacia								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Vaccinium								
Dasyneura	3	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Solenozopheria	.....	1	.....	.....	.....	.....	.....	.....
Primulaceae								
Lysimachia								
Dasyneura	1	.....	.....	.....	.....	.....	.....	.....
Lestremia	1	.....	.....	.....	.....	.....	.....	.....
Sapotaceae								
Bumelia								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Ebenaceae								
Diospyros								
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Oleaceae	*10*	.....	.....	.....	*1*	.....	.....	*5*
Fraxinus								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....
Contarinia	1	.....	.....	.....	.....	.....	.....	.....
Colpodia	1	.....	.....	.....	.....	.....	.....	.....
Dasyneura	3	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	5
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Phytophaga	1	.....	.....	.....	.....	.....	.....	.....
Psyllopsis	.....	.....	.....	.....	1	.....	.....	.....
Rhizomyia	1	.....	.....	.....	.....	.....	.....	.....
Apocynaceae								
Apocynum								
Itonida	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Asclepiadaceae								
Asclepias								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Neolasioptera	1	.....	.....	.....	.....	.....	.....	.....
Convolvulaceae								
Ipomoea								
Camptoneuromyia	1	.....	.....	.....	.....	.....	.....	.....
Schizomyia	1	.....	.....	.....	.....	.....	.....	.....
Convolvulus								
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Boraginaceae								
Amsinckia								
Schizomyia	1	.....	.....	.....	.....	.....	.....	.....
Verbenaceae	*7*	.....	.....	.....	.....	.....	.....	*1*
Verbena								
Cecidomyia	2	.....	.....	.....	.....	.....	.....	.....
Lasioptera	1	.....	.....	.....	.....	.....	.....	.....
Lestodiplosis	1	.....	.....	.....	.....	.....	.....	.....
Eriophyes	.....	.....	.....	.....	.....	.....	.....	1
Clerodendron								
Asphondylia	1	.....	.....	.....	.....	.....	.....	.....
Stachytarpha								
Hyperdiplosis	1	.....	.....	.....	.....	.....	.....	.....
Labiatae	*14*	*1*	.....	.....	.....	.....	*1*	.....
Audibertia								
Rhopalomyia	1	.....	.....	.....	.....	.....	.....	.....
Trichostema								
Stagmatophora	.....	.....	.....	.....	.....	.....	1	.....
Scutellaria								
Cecidomyia	1	.....	.....	.....	.....	.....	.....	.....

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Nepeta								
Aylax		I						
Galeopsis								
Lasioptera	I							
Salvia								
Rhopalomyia	I							
Monarda								
Cecidomyia	2							
Lycopus								
Lasioptera	2							
Mentha								
Cecidomyia	I							
Dasyneura	2							
Giardomyia	I							
Neolasioptera	I							
Collinsonia								
Cecidomyia	2							
Solanaceae								
Lycopersicum								
Contarinia	I							
Solanum								
Neolasioptera	I							
Scrophulariaceae	*6*							*I*
Scrophularia								
Lestodiplosis	I							
Pentstemon								
Lasioptera	I							
Mimulus								
Neolasioptera	I							
Diplacus								
Asphondylia	I							
Lasioptera	I							
Gerardia								
Cecidomyia	I							
Eriophyes								I
Bignoniaceae								
Tecoma								
Itonida	I							
Catalpa								
Itonida	I							
Plantaginaceae								
Plantago								
Lestodiplosis	I							
Rubiaceae								
Galium								
Dasyneura	I							
Eriophyes								I
Cephalanthus								
Eriophyes								2
Rhabdophaga	I							
Caprifoliaceae	*17*							*3*
Diervilla								
Asphondylia	I							
Lasioptera	I							
Lonicera								
Cecidomyia	I							
Symphoricarpos								
Cecidomyia	I							
Thomasia	I							
Viburnum								
Cecidomyia	5							
Cystiphora	I							
Eriophyes								2
Neolasioptera	I							
Sackenomyia	I							
Schizomyia	I							
Sambucus								
Arthrocnodax	I							
Asphondylia	I							
Eriophyes								I
Neolasioptera	I							
Youngomyia	I							

American Insect Galls — (continued)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Cucurbitaceae								
Cucumeris								
Aphidoletes	1							
Contarinia	1							
Compositae	*151*	*12*		*8*			*8*	*3*
Vernonia								
Asphondylia	1							
Lasioptera	1							
Youngomyia	1							
Eupatorium								
Asphondylia	1							
Cecidomyia	1							
Brachyneura	1							
Clinorhyncha	1							
Contarinia	1							
Dasyneura	1							
Lestodiplosis	1							
Neolasioptera	2							
Mikania								
Trypetid				1				
Grindelia								
Asteromyia	1							
Rhopalomyia	1							
Gutierrezia								
Asteromyia	1							
Rhopalomyia	1							
Chrysopsis								
Rhopalomyia	1							
Solidago								
Asphondylia	2							
Asteromyia	9							
Camptoneuromyia	3							
Cecidomyia	1							
Dasyneura	3							
Dryomyia	1							
Eucosma							1	
Eurosta				2				
Eutreta				1				
Gnorimoschema							4	
Lasioptera	3							
Lestodiplosis	4							
Oedaspis				1				
Oligotrophus	1							
Rhopalomyia	16							
Trotteria	1							
Bigelovia								
Asphondylia	1							
Asteromyia	2							
Aylax		1						
Cecidomyia	3							
Dasyneura	1							
Eurosta				1				
Rhopalomyia	5							
Aster								
Asphondylia	1							
Asteromyia	13							
Gnorimoschema							3	
Lasioptera	1							
Neolasioptera	2							
Rhopalomyia	5							
Acamptopappus								
Gnorimoschema							1	
Erigeron								
Asteromyia	1							
Neolasioptera	1							
Rhopalomyia	1							
Sericocarpus								
Asphondylia	1							
Baccharis								
Cecidomyia	1							

American Insect Galls — (concluded)

PLANT FAMILIES AND GENERA, INSECT GENERA	Itonididae	Cynipidae	OTHER GALL INSECTS					
			Col.	Dipt.	Hem.	Hym.	Lep.	Acarid
Gnorimoschema							1	
Rhopalomyia	3							
Ericameria								
Rhopalomyia	1							
Antennaria								
Asphondylia	1							
Rhopalomyia	2							
Gnaphalium								
Asphondylia	1							
Silphium								
Aylax		4						
Parthenium								
Paradiplosis	1							
Iva								
Eriophyes								1
Ambrosia								
Aulacidea		1						
Neolasioptera	1							
Rudbeckia								
Asphondylia	1							
Cecidomyia	2							
Lasioptera	1							
Lepachys								
Cecidomyia	1							
Helianthus								
Asphondylia	3							
Cecidomyia	1							
Hormomyia	2							
Lasioptera	2							
Neolasioptera	2							
Actinomeris								
Cecidomyia	1							
Helenium								
Asphondylia	1							
Cecidomyia	1							
Achillea								
Clinorhyncha	1							
Rhopalomyia	1							
Anthemis								
Cecidomyia	1							
Chrysanthemum								
Diarthronomyia	1							
Artemisia								
Asphondylia	1							
Cecidomyia	1							
Diarthronomyia	4							
Eriophyes								2
Rhopalomyia	7							
Trypetid				3				
Senecio								
Lasioptera	1							
Rhopalomyia	1							
Arctium								
Cecidomyia	1							
Taraxacum								
Aylax		1						
Lactuca								
Aulacidea		3						
Lasioptera	1							
Sonchus								
Aulacidea		1						
Encelia								
Asphondylia	1							
Rhopalomyia	1							
Lygodesmia								
Aylax		1						
Prenanthes								
Aulacidea		1						
Cystiphora	1							
Total species	*682*	*445*	*12*	*18*	*61*	*44*	*17*	*162*

Synopsis of American Gall Makers

DIPTERA		HYMENOPTERA		COLEOPTERA		LEPIDOPTERA		HEMIPTERA		ERIOPHYIDAE	
Itonididae		*Cynipidae*		*Buprestidae*		*Sesiidae*		*Aphididae*		Anthocoptes	1
Allomyia	1	Amphibolips	28	Agrilus	4	Sesia	1	Chermes	3	Eriophyes	150
Aphidoletes	2	Andricus	125			*Tortricidae*		Colopha	1	Phyllocoptes	10
Aplonyx	1	Aulacidea	6	*Cerambycidae*		Ecdytolopha	1	Hamamelistes	1	Siteroptes	1
Arthrocnodax	6	Aylax	10	Oberea	1	Eucosma	1	Hormaphis	1		
Asphondylia	40	Bassettia	1	Saperda	4	Proteoteras	1	Pemphigus	7		162
Asteromyia	27	Biorhiza	4					Phylloxera	31		
Astrodiplosis	1	Blenocnema	1	*Cucurlionidae*			3	Schizoneura	2		
Asynapta	2	Callirhytis	43	Ampeloglypter	1	*Gelechidae*		Tetraneura	1		
Brachyneura	2	Chilaspis	1	Cryptorhynchus	1	Gnorimoschema	8				
Camptomyia	1	Compsodryoxenus	2	Podapion	1				47		
Camptoneuromyia	4	Cynips	39			*Elachistidae*					
Caryomyia	17	Diastrophus	10		12	Coleophora	1	*Psyllidae*			
Cecidomyia	153	Disholcaspis	30			Stagmatophora	2	Livia	1		
Cincticornia	11	Dolichostrophus	1					Pachypsylla	9		
Clinodiplosis	1	Dryocosmus	1				3	Psyllopsis	1		
Clinorhyncha	3	Dryophanta	42			*Tineidae*					
Colpodia	4	Eumayria	1			Ectoedemia	2		11		
Contarinia	15	Gonaspis	1					*Coccidae*			
Coquillettomyia	1	Holocynips	1					Coccids	2		
Ctenodactylomyia	1	Loxaulus	3								
Cystiphora	2	Neuroterus	43								
Cystodiplosis	1	Odontocynips	1								
Dasyneura	61	Phamacis	1								
Diarthronomyia	5	Philonix	13								
Dicrodiplosis	4	Rhodites	29								
Dryomyia	1	Solenozopheria	1								
Erosomyia	1	Trichoteras	1								
Feltomyia	3	Trigonaspis	2								
Giardomyia	1	Trissandricus	1								
Hormomyia	7	Xystoteras	1								
Hyperdiplosis	1	Zopheroteras	1								
Itonida	16										
Janetiella	5		444								
Joannisia	1	*Tenthredinidae*									
Kronomyia	1	Euura	9								
Lasioptera	52	Pontania	5								
Lasiopteryx	3										
Leptosyna	1		14								

Synopsis of American Gall Makers — (continued)

DIPTERA		HYMENOPTERA		COLEOPTERA	LEPIDOPTERA	HEMIPTERA	ERIOPHYIDAE
Lestodiplosis	31	*Cephidae*					
Lestremia	1	Cephus	2				
Lobopteromyia	1						
Miastor	1	*Eurytomidae*					
Monardia	2	Decatomidae	1				
Monarthropalpus	1	Eurytoma	1				
Mycodiplosis	7	Eurytomacharis	2				
Neolasioptera	21	Evoxysoma	1				
Obolodiplosis	1	Isosoma	16				
Oligarces	1	Isomorpha	1				
Oligotrophus	4	Prodecatoma	1				
Onodiplosis	1						
Paradiplosis	1		23				
Parallelodiplosis	8	*Chalcididae*					
Phytophaga	16	Chalcid	1				
Porricondyla	2						
Prionellus	1	*Torymidae*					
Prodiplosis	2	Megastigmus	3				
Protaplonyx	1	Syntomaspis	1				
Retinodiplosis	7						
Rhabdophaga	30		4				
Rhizomyia	4						
Rhopalomyia	50						
Sackenomyia	3						
Schizomyia	7						
Thecodiplosis	7						
Thomasia	1						
Trotteria	2						
Walshomyia	2						
Winnertzia	4						
Youngomyia	3						
	682						
Trypetidae							
Eurosta	3						
Eutreta	1						
Oedaspis	1						
Trypetid	5						
	10						

Oscinidae						
Anthracophaga	I					
Chlorops	3					
Oscinis	I					
	5					
Agromyzidae						
Agromyza	4					

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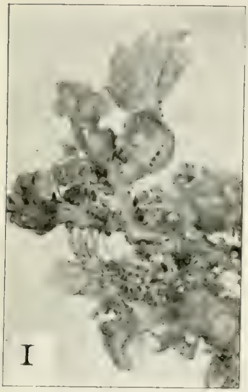
Explanation of Plates

Plate 1

Cynipid Galls

1 Gall on oak, of Andricus cicatriculus Bass. (After Thompson)
2 Gall on oak, of Andricus flocci Walsh. (After Thompson)
3 Leafy oak gall, Andricus foliatus Ashm. (After Weld)
4 Oak wool gall, Andricus lana Fitch. (After Thompson)
5 Gall on oak, of Andricus ostensackeni Bass. (After Thompson)
6 Gall on oak, of Andricus piperoides Bass. (After Thompson)
7 Gall on oak, of Andricus perditor Bass. (After Thompson)
8 Galls on oak, of Andricus ventricosus Bass. Single gall and a typical cluster. (After Stebbins)
9 Horned oak gall, Andricus cornigerus O. S. on pin oak, Q. palustris

Plate 1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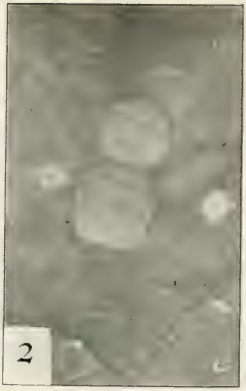
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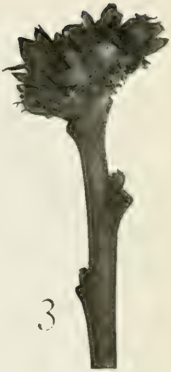
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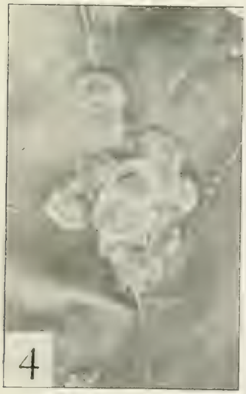
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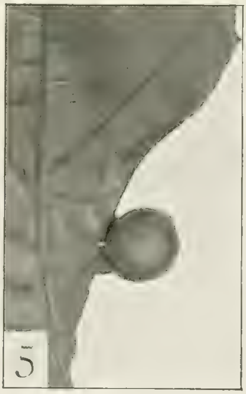
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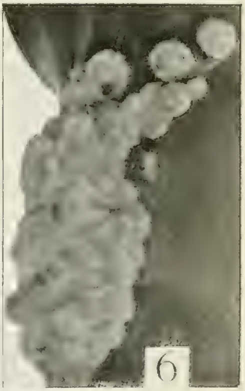
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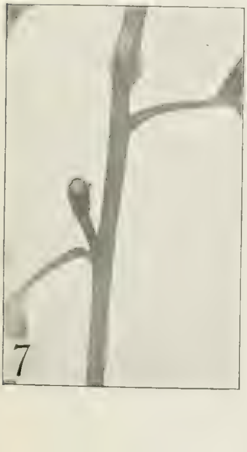
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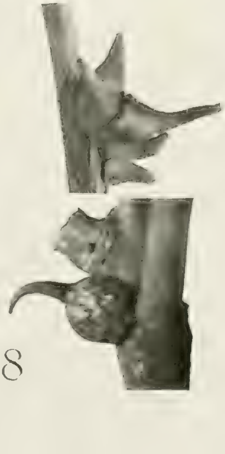
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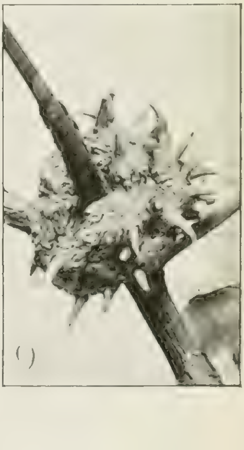
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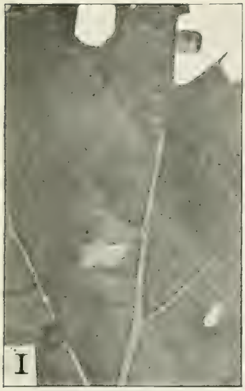
Plate 2

Cynipid Galls

1 Gall on oak, of Andricus rileyi Ashm. (After Thompson)
2 White oak club gall, Andricus clavula O. S. (After Thompson)
3 Oak wart gall, Andricus futilis Bass. (After Thompson)
4 Gall on oak, of Andricus operator O. S. Spring form. (After Thompson)
5 Gall on oak, of Andricus operator O. S. Fall form. (After Thompson)
6 Oak nipple gall, Andricus papillatus O. S. (After Thompson)
7 Oak flower gall, Callirhytis pulchra Bass. (After Thompson)
8 Gall on oak, of Andricus scitula Bass. (After Thompson)
9 Scrub oak club gall, Callirhytis similis Bass. (After Thompson)

Plate 2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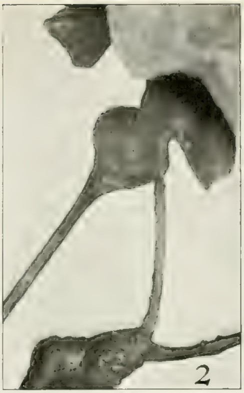
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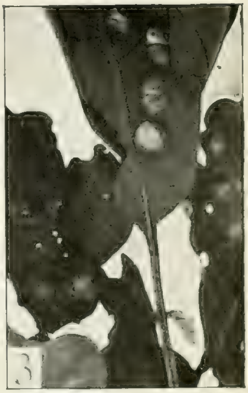
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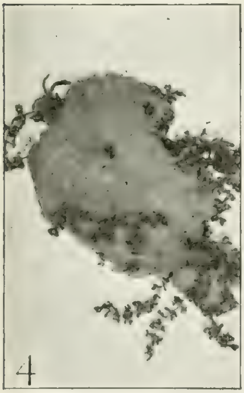
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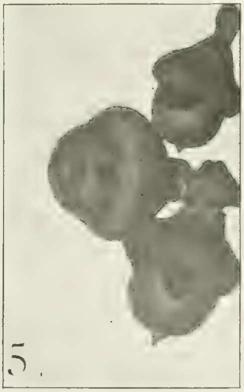
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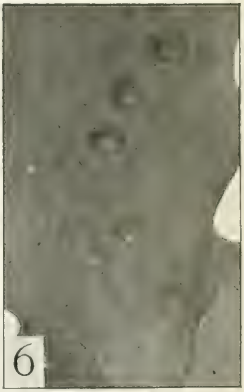
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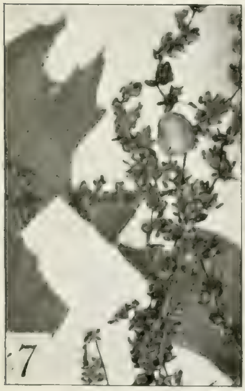
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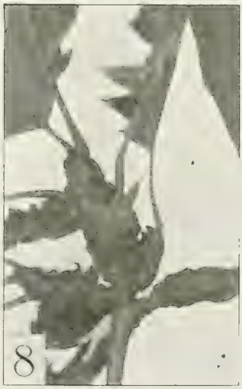
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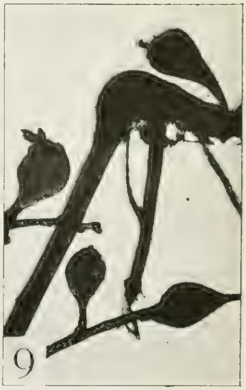
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Plate 3

Insect Galls

1 Oak leaf seed gall, Cynips decidua Bass. (After Thompson)
2 Gall on oak, Andricus formosa Bass. (After Weld)
3 Oak rosette gall, Cynips frondosa Bass. (After Thompson)
4 Gall on oak, of Cynips glandulosus Riley. (After Thompson)
5 Lobed oak gall, Cynips strobilana O. S.
6 Gall on oak, of Aulacidea podagrae Bass. (After Thompson)
7 Willow egg gall, Euura ovum Walsh. (After Thompson)
8 Gall on oak, of Pontania desmodioides Walsh. (After Thompson)
9 Willow apple gall, Pontania pomum Walsh. (After Thompson)

Plate 3

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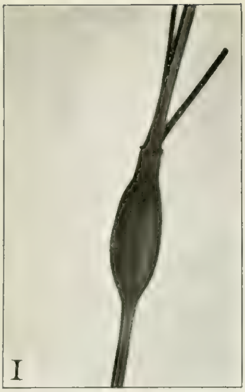
Plate 4

Insect Galls

1 Dipterous gall, probably Agromyza on Clematis. (After Thompson)
2 Iris leaf gall, Agromyza laterella Zett. (After Thompson)
3 Poplar twig gall, Agromyza schineri Giraud
4 Gall on Solidago, of Eurosta reticulata Snow. (After Thompson)
5 Gall of Eutreta sparsa Wied. (After Thompson)
6 Wheat sheath joint worm, Isosoma vaginicolum Doane. (After Doane)
7 Locust twig gall, Ecdytolopha inscitiana Zell. (After Thompson)
8 Scarred goldenrod gall, Eucosma scudderiana Clem. (After Thompson)
9 Irregular, subglobose grape leaf gall, showing a slight swelling on the upper surface and a globose enlargement beneath. ?Coleophora sp. (After Clarke)

Plate 4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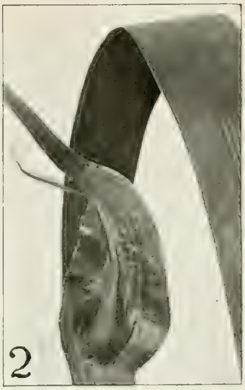
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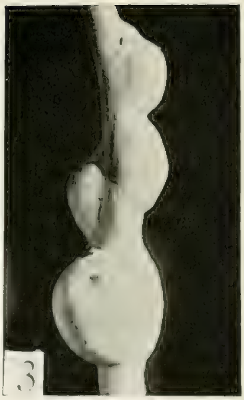
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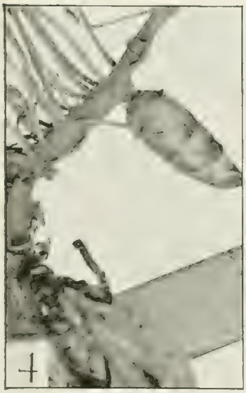
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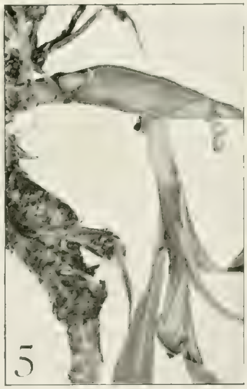
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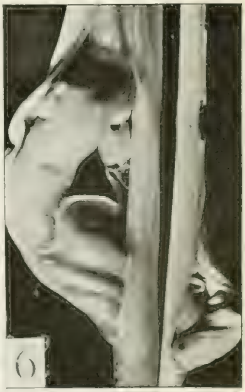
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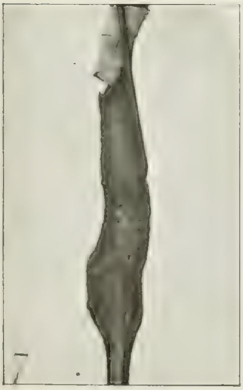
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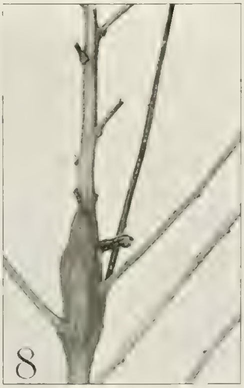
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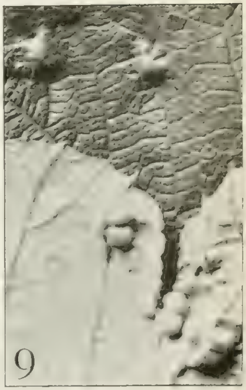
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Plate 5

Plate 5

Midge Galls

1 Ash leaves inhabited by Arthrocnodax sambucifolia Felt, the deformation probably produced by a mite, Eriophyes sp. (After Thompson)

2 Cone-flower gall, Asphondylia conspicua O. S.

3 Sunflower purse gall, Asphondylia globulus O. S. (After Weld)

4 Adherent capsule gall on Solidago, inhabited by the nun midge, Asphondylia monacha O. S. and Camptoneuromyia adhesa Felt

5 Gall of nun midge, Asphondylia monacha O. S., on narrow-leaved goldenrod

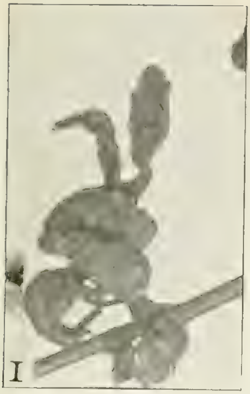
6 Cactus infested by Asphondylia opuntiae Felt. (After Essig)

7 Gall of Asteromyia sp. on Ionactis lineariifolius. (After Clarke)

8 Blister gall of ? Caryomyia species on hickory

9 Gall of spruce bud midge, Rhabdophaga swainei Felt. (After Swaine)

Plate 5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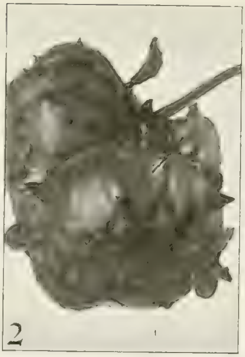
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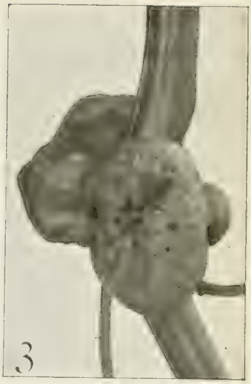
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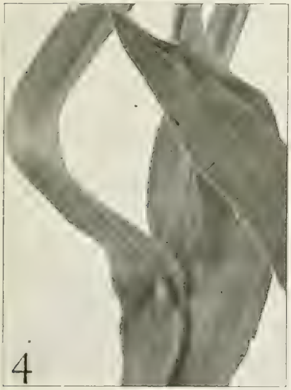
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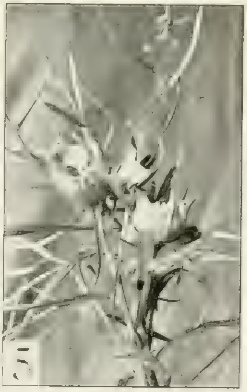
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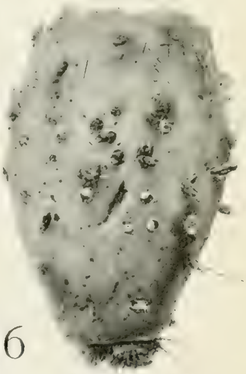
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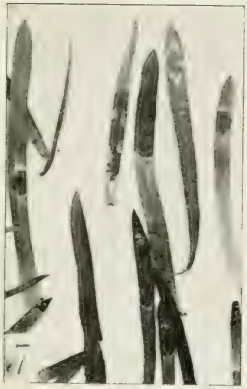
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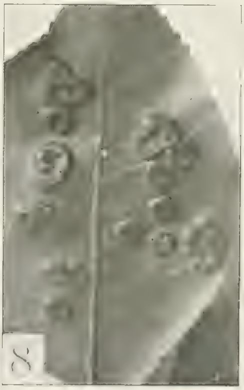
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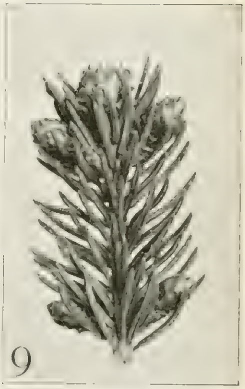
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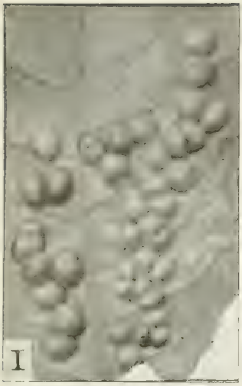
Plate 6

Midge Galls

1 Gall on hickory, of Caryomyia antennata Felt. (After Thompson)
2 Hickory seed gall, Caryomyia caryaecola O. S.
3 Hickory seed gall, Caryomyia "caryaecola O. S." Another type. (After Stebbins)
4 Hickory onion gall, Caryomyia holotricha O. S. (After Thompson)
5 Gall on hickory, of Caryomyia sp.
6 Gall on hickory, of Caryomyia sp. (After Thompson)
7 Hickory leaf gall, Caryomyia caryae O. S.
8 Gall on hickory, of Caryomyia thompsoni Felt. (After Thompson)
9 Gall on hickory, of Caryomyia consobrina Felt. (After Clarke)

Plate 6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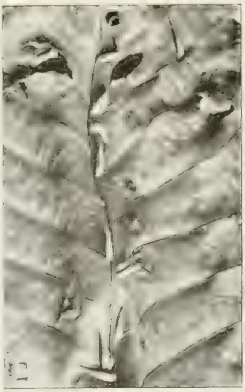
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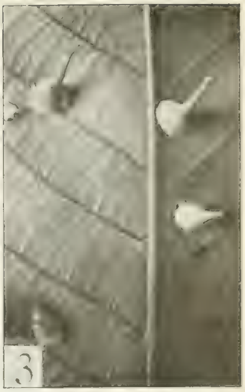
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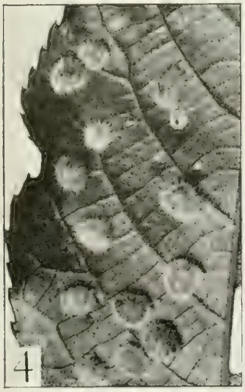
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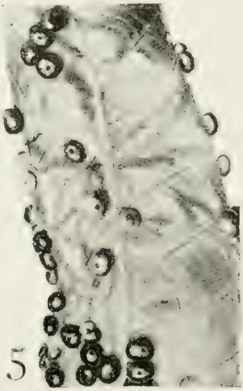
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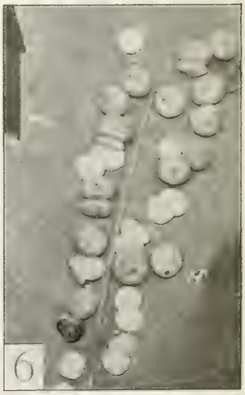
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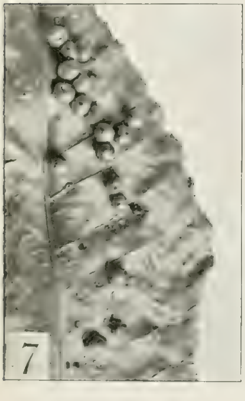
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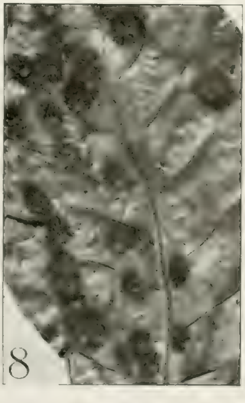
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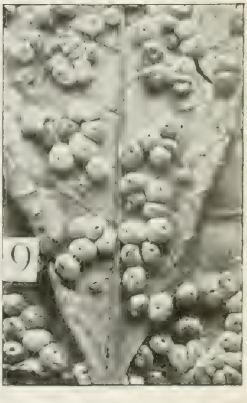
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Midge Galls

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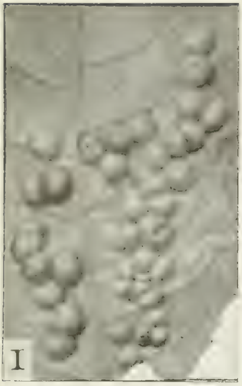
5 Gall on hickory, of Caryomyia sp.
6 Gall on hickory, of Caryomyia sp. (After Thompson)
7 Hickory leaf gall, Caryomyia caryae O. S.
8 Gall on hickory, of Caryomyia thompsoni Felt. (After Thompson)
9 Gall on hickory, of Caryomyia consobrina Felt. (After Clarke)

Plate 6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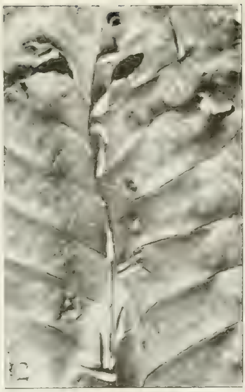
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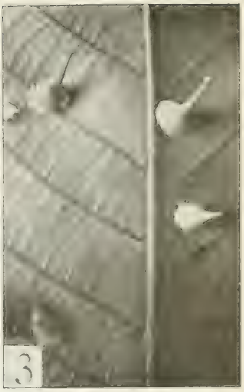
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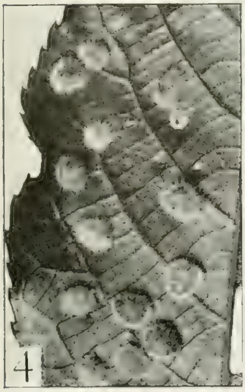
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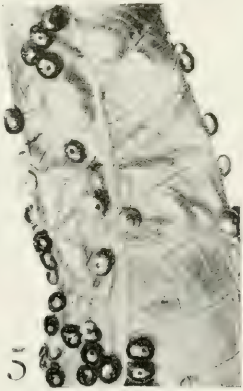
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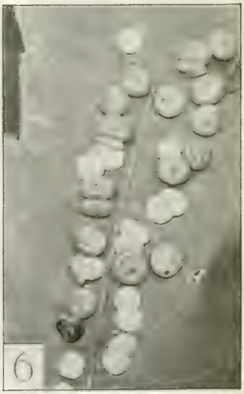
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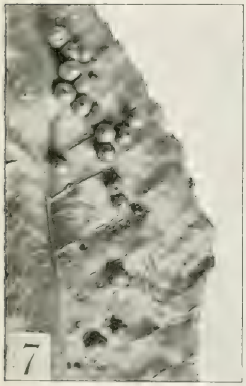
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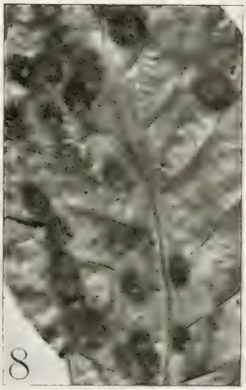
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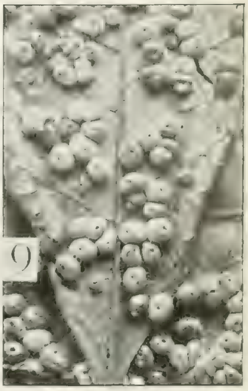
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Plate 7

Midge Galls

1 Balsam gall midge, Cecidomyia balsamicola Lintn. (After Thompson)

2 Gall of Cecidomyia sp., on balm of Gilead

3 Hazel catkin gall, Cecidomyia squamulicola Stebb.

4 Touch-me-not gall, Cecidomyia impatientis O. S. (After Thompson)

5 Gall on cherry racemes produced by Cecidomyia racemi Stebb. (After Stebbins)

6 Wild cherry bud gall, Cecidomyia serotinae O. S. (After Clarke)

7 Smilax blister, Camptoneuromyia rubifolia Felt.

8 Nettle bullet gall, Cecidomyia sp. on Urtica. (After Weld)

9 Linden wart gall, Cecidomyia verrucicola O. S., young galls. (After Thompson)

Plate 7

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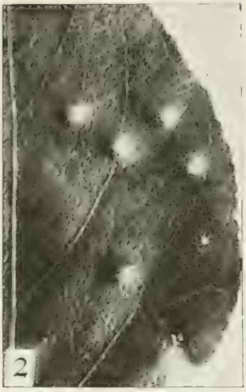
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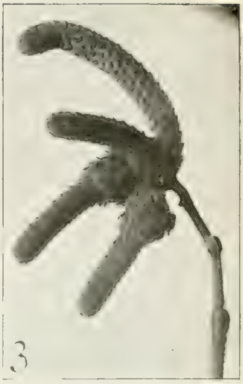
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Plate 8

Midge Galls

1 Oak spangles, Cecidomyia poculum O. S. (After Thompson)

2 Probably the same as figure 1. (After Weld)

3 Vein pocket gall, Parallelodiplosis florida Felt, on oak. (After Clarke)

4 Oak gall of Cecidomyia, adult unknown. Resembling much that of Neuroterus niger Gill. (After Clarke)

5 Marginal fold gall of Itonida foliora Rssl. & Hkr., on oak. (After Clarke)

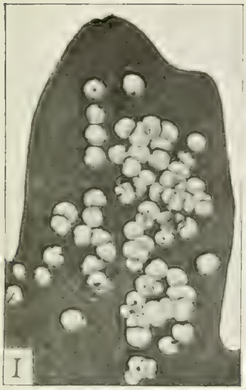
6 Oak leaves with lobes folded by Cecidomyia sp., adult unknown. (After Clarke)

7 Oak blister midge, Cincticornia pustulata Felt. (After Clarke)

8 Oak leaf showing galls of Cincticornia sp., possibly C. simpla Felt.

9 Purple oak vein gall, Cincticornia podagrae Felt.

Plate 8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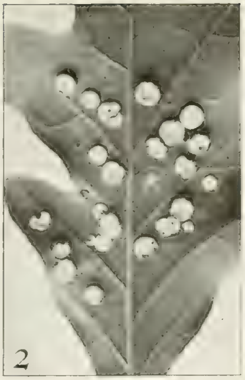
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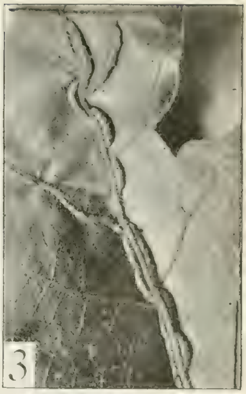
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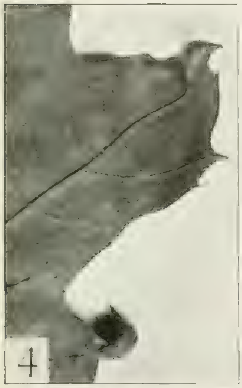
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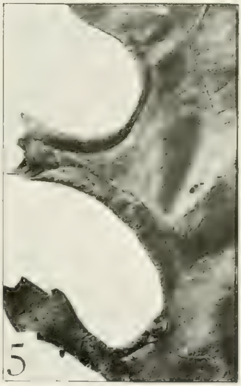
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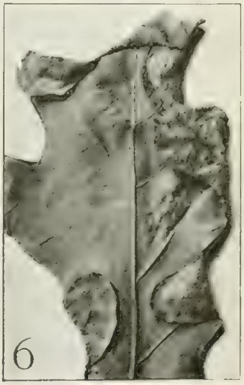
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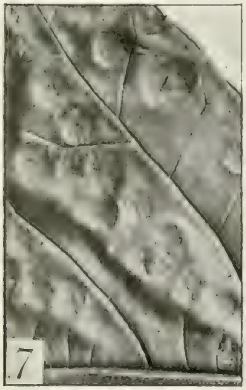
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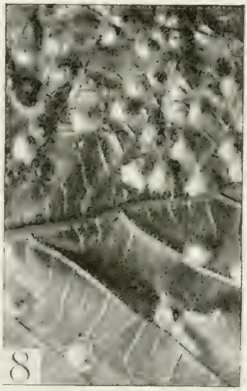
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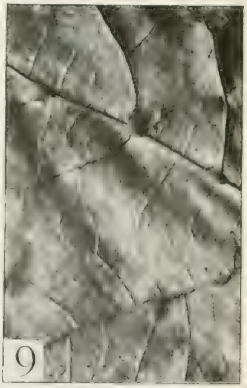
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Plate 9

9

Midge Galls

1 Subglobose vein gall on oak, produced by Cecidomyia sp., adult unknown

2 Gall on oak, of Cincticornia majalis O. S. (After Thompson)

3 Oak pill gall, Cincticornia pilula? Walsh. (After Thompson)

4 Clematis bud gall, Contarinia clematidis Felt. (After Thompson)

5 Grape blister gall, Cecidomyia species. (After Weld)

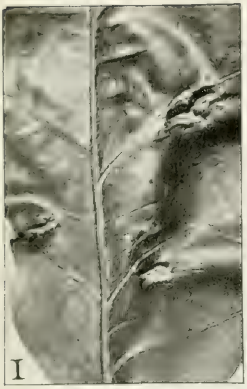
6 Chokecherry midge, Contarinia virginianiae Felt. (After Thompson)

7 Arrow-wood blister midge, Cystiphora viburnifolia Felt. (After Clarke)

8 Honey locust pod gall, Dasyneura gleditschiae O. S. (After Clarke)

9 Loosestrife bud gall, Dasyneura lysimachiae Beutm. (After Clarke)

Plate 9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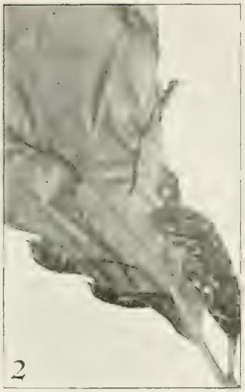
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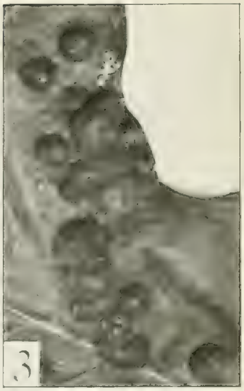
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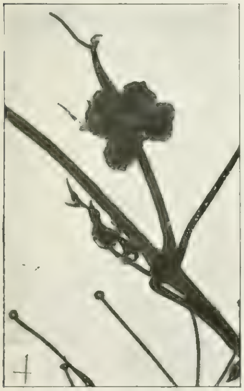
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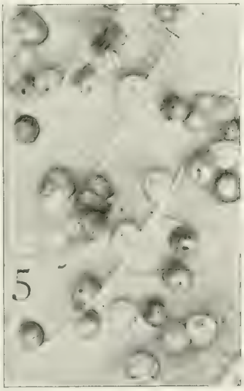
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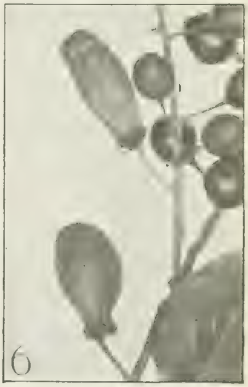
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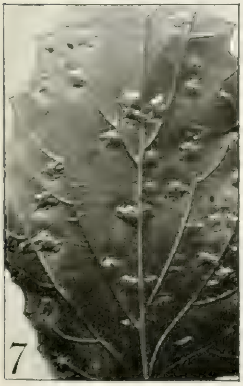
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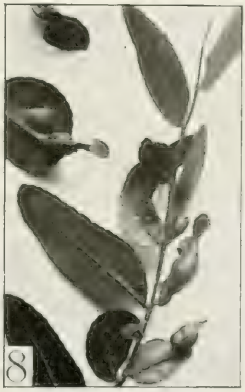
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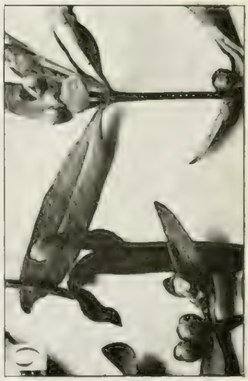
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Plate 10

Midge Galls

1 Rose leaf midge, Dasyneura ?rosarum Hardy. (After Thompson)
2 Willow pod midge, Dasyneura salicifolia Felt. (After Clarke)
3 Elm buds blasted by Dasyneura ulmea Felt. (After Houser)
4 Galls of Chrysanthemum midge, Diarthronomyia hypogaea H. Lw.
5 Sunflower bullet gall, Hormomyia bulla Felt. (After Weld)
6 Willow lipped gall, Hormomyia verruca Walsh. (After Clarke)
7 Tulip spot gall, Thecodiplosis liriodendri O. S. (After Thompson)
8 Gall on Impatiens, of Lasioptera impatientifolia Felt. (After Thompson)
9 Thorn vein gall, Lobopteromyia venae Felt. (After Thompson)

Plate 10

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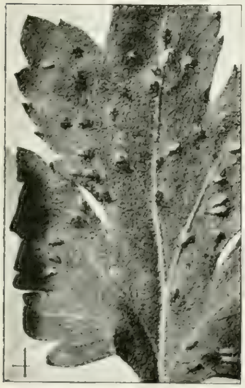
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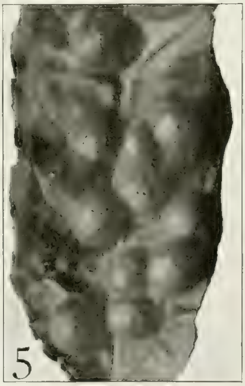
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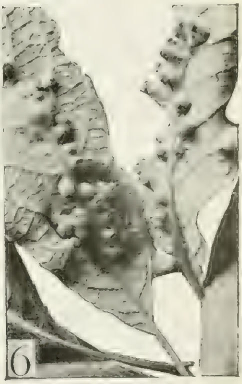
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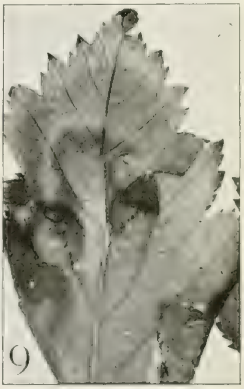
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Plate 11

Midge Galls

1 White snake root flower buds from which was reared Lestodiplosis eupatorii Felt.

2 Gall of Crataegus leaf from which was reared Lestodiplosis crataegifolia Felt. This midge is probably predaceous. (After Thompson)

3 Gall on Crataegus leaf from which was reared Lestodiplosis crataegifolia Felt. (After Thompson)

4 Cherry leaf from which was reared Mycodiplosis cerasifolia Felt. (After Thompson)

5 Beaked willow gall, Phytophaga rigidae O. S.

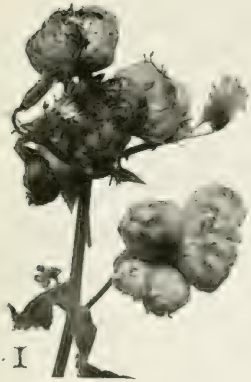
6 Elm leaves deformed by Phytophaga ulmi Beutm. (After Thompson)

7 Willow cabbage gall, Rhabdophaga brassicoides Walsh.

8 Willow twig showing deformation, provisionally referred to Rhabdophaga globosa Felt.

9 Nodule willow gall, Rhabdophaga nodula Walsh.

Plate 11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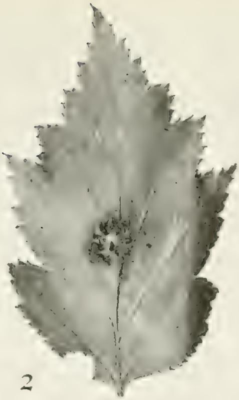
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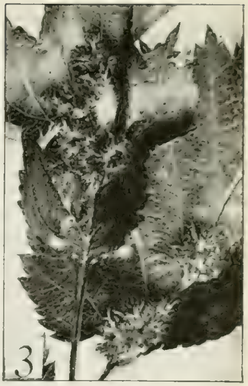
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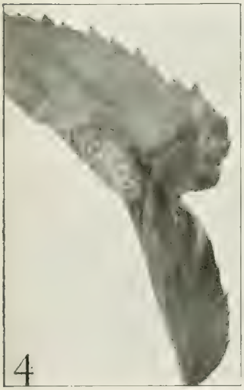
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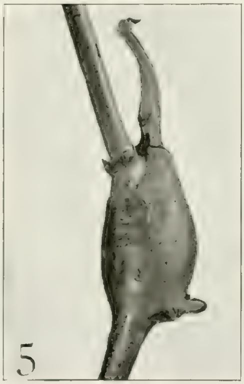
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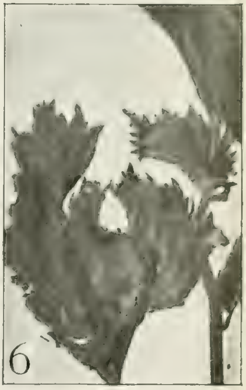
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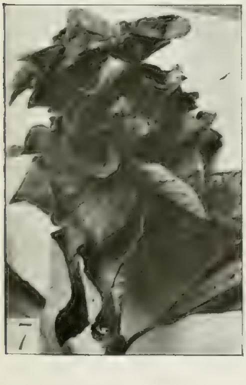
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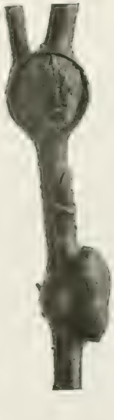
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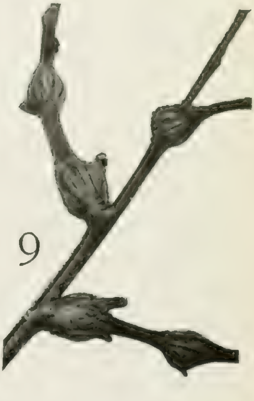
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Plate 12

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Midge Galls

2 Spiraea pod gall, Rhabdophaga salicifolia Felt. (After Thompson)

1 Willow twig deformed by Rhabdophaga salicis Schr.

3 Willow tips showing blasted apical buds, the work of Cecidomyia sp., adult unknown.

4 Wheat ear gall, Rhabdophaga triticoides Walsh, on willow.

5 Downy flower gall, Rhopalomyia anthophila O. S. (After Weld)

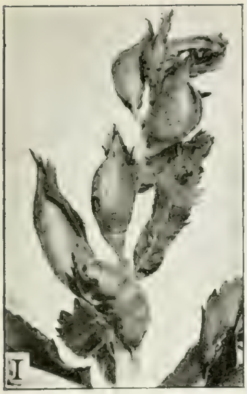
6 Beaked flower gall, Rhopalomyia racemicola O. S. (After Weld)

7 Solidago showing subterranean bud galls of Rhopalomyia bulbula Felt. (After Thompson)

8 Galls of gooseberry bud midge, Rhopalomyia grossulariae Felt. (After Houser)

9 Root stalk bud midge, Rhopalomyia hirtipes O. S. (After Stebbins)

Plate 12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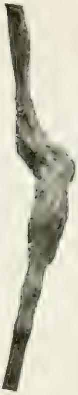
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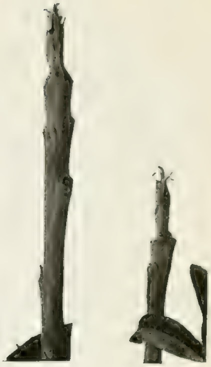
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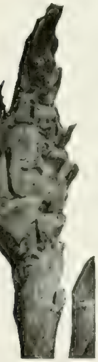
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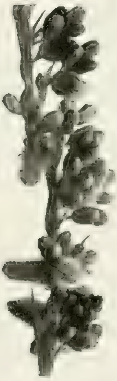
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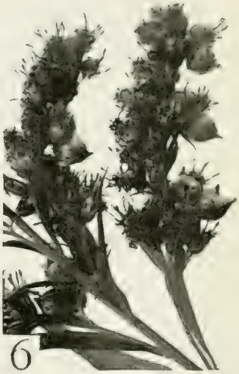
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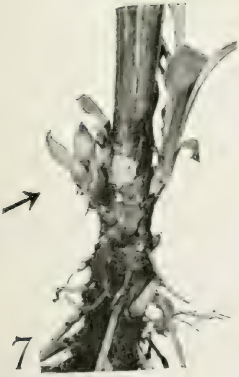
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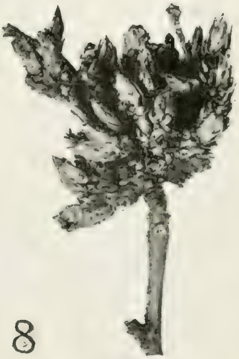
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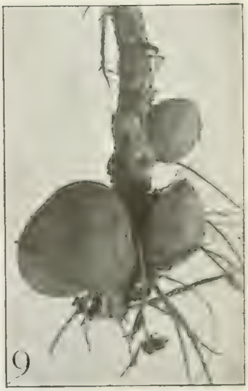
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Plate 13

Midge Galls

1 White flowered aster buds deformed by Rhopalomyia lateriflori Felt. (After Clarke)

2 Goldenrod bunch gall, Rhopalomyia solidaginis Lw.

3 Flower bud galls of Aster undulatus, deformed by Rhopalomyia sp. (After Clarke)

4 Subterranean galls on Solidago inhabited by Rhopalomyia thompsoni Felt. (After Thompson)

5 Gall on arrow-wood leaves produced by the purple vein midge, Sackenomyia viburnifolia Felt.

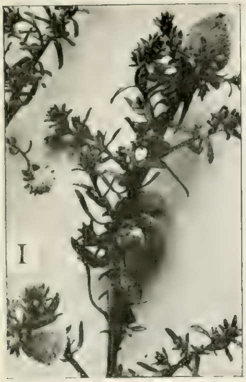
6 Grape filbert gall, Schizomyia coryloides Walsh & Riley. (After Weld)

7 Gall of elder flower midge, Youngomyia umbellicola O. S. (After Weld)

8 Gall on oak leaves produced by Cincticornia globosa Felt. (After Clarke)

Dogwood spot gall, Lasioptera corni Felt. (After Clarke)

Plate 13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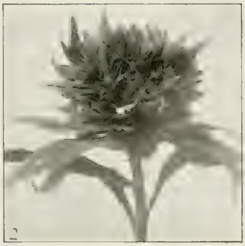
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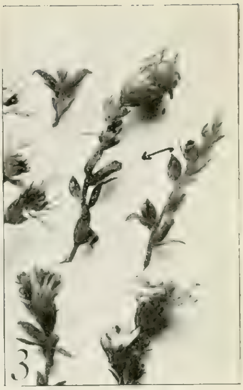
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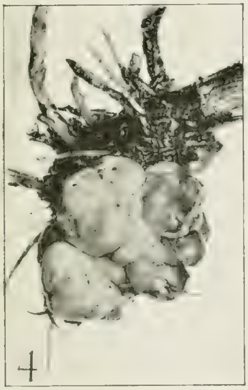
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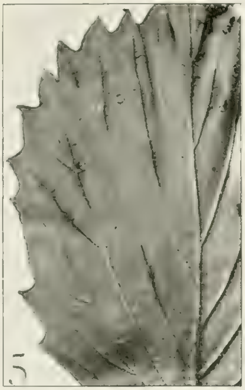
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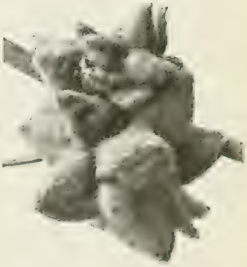
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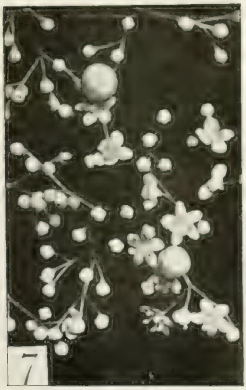
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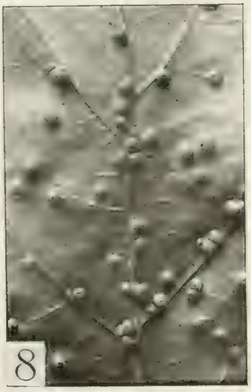
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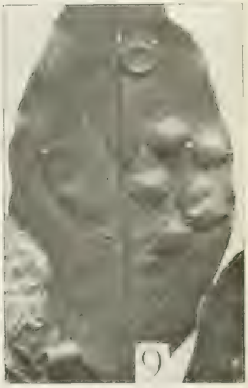
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Plate 14

Plant Galls

1 Long spruce cone gall, Chermes cooleyi Gill.

2 Hackberry nipple gall, Pachypsylla mamma Riley. (After Thompson)

3 Red pouch gall, Pemphigus rhois Fitch. (Author's illustration)

4 Hickory leaf gall produced by Phylloxera caryae-avellana Riley. (After Thompson)

5 Hickory leaf gall produced by Phylloxera caryaefallax Riley. (After Thompson)

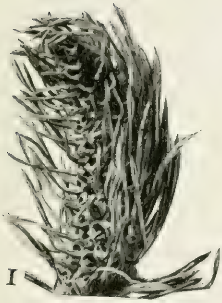
6 Hickory leaf gall produced by Phylloxera caryaeglobuli Walsh. (After Thompson)

7 Hickory leaf gall produced by Phylloxera rimosalis Perg. (After Thompson)

8 Hickory leaf gall produced by Phylloxera caryaesemen Walsh. (After Thompson)

9 Axillary Spiraea bud galls infested by Cecidomyia sp. (After Clarke)

Plate 14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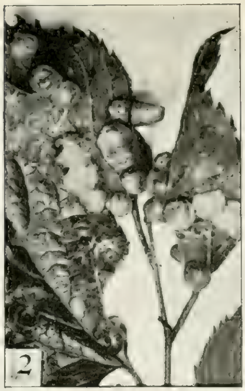
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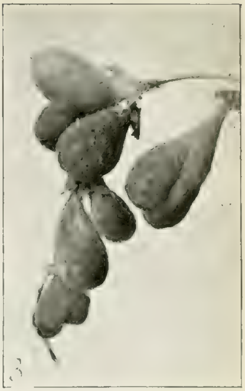
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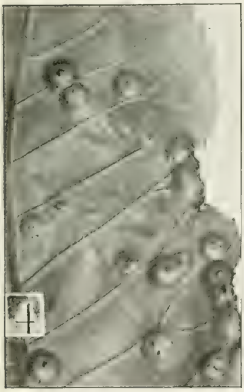
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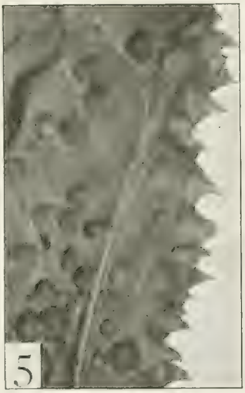
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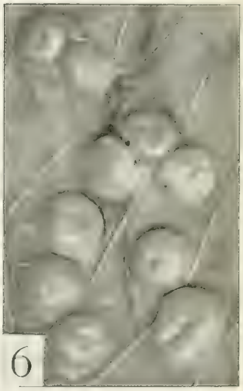
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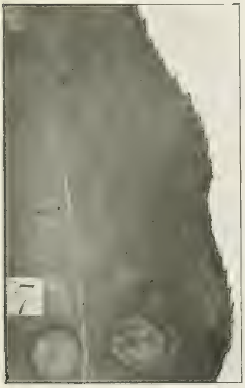
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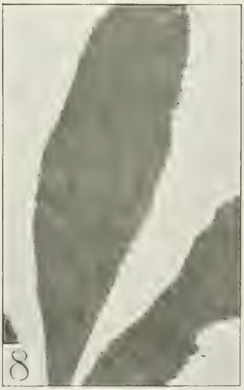
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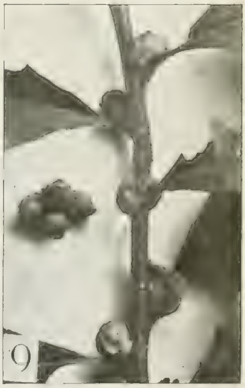
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Plate 15

Plant Mite Galls

1 Alder leaf galls produced by a plant mite, Eriophyes sp. (After Thompson)

2 Bud galls on yellow birch produced by a plant mite, Eriophyes sp.

3 Foliage deformed by ash Psyllid, Psyllopsis fraxinicola Forst. (Author's illustration)

4 Hickory leaves with margins inrolled by Eriophyes sp. (After Thompson)

5 Hazel or Corylus buds deformed by Eriophyes sp. (After Thompson)

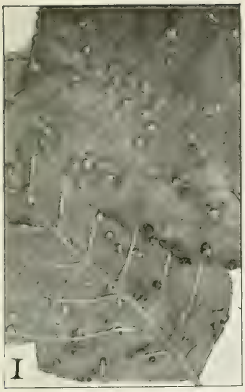
6 Bayberry leaves badly deformed by Eriophyes sp. (After Thompson)

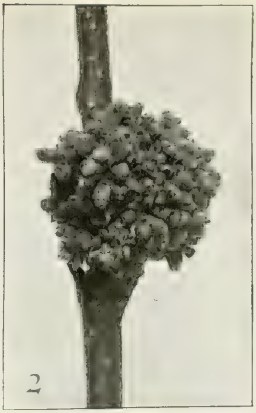
7 Beech leaves affected by Eriophyes sp. (After Thompson)

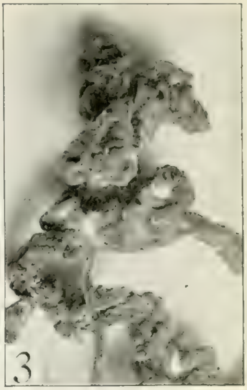
8 Ash leaves showing numerous galls of Eriophyes fraxini Garm. (After Thompson)

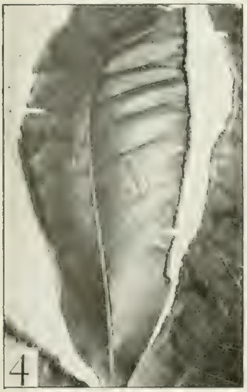
9 Ash flower gall, Eriophyes fraxiniflorae Felt. (After Thompson)

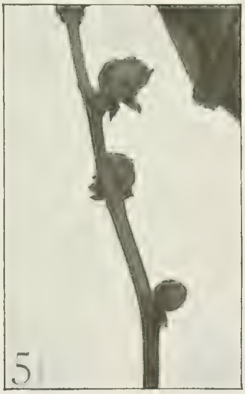
Plate 15

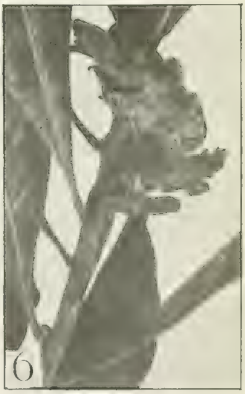


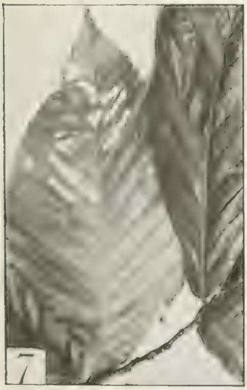


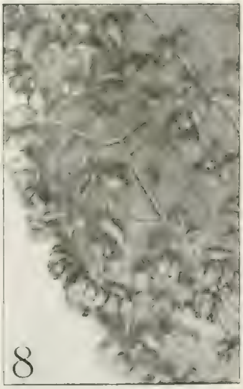












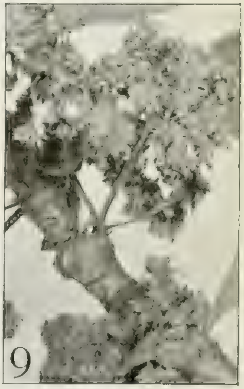


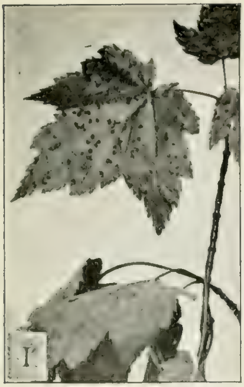
Plate 16

Plate 16

Plant Mite Galls

1 Eriophyes sp. on red maple, Acer rubrum. (After Thompson)
2 Wild cherry pouch gall, Eriophyes ?padi Nal. (After Thompson)
3 Poplar leaves deformed possibly by Eriophyes populi Nal. (After Thompson)
4 Leaf gall on Pyrus arbutifolia, produced by Eriophyes sp. (After Thompson)
5 Oak buds blasted by Eriophyes sp. (After Thompson)
6 Galls on poison ivy produced by Eriophyes sp. (After Thompson)
7 Terminal leaves of Rhus copallina deformed by Eriophyes sp. (After Thompson)
8 Willow leaf gall produced by Eriophyes sp. (After Thompson)
9 Maple bladder gall, Phyllocoptes quadripes Shim.

Plate 16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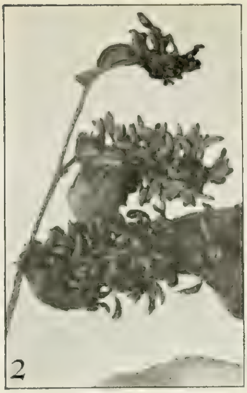
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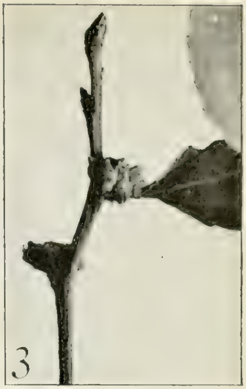
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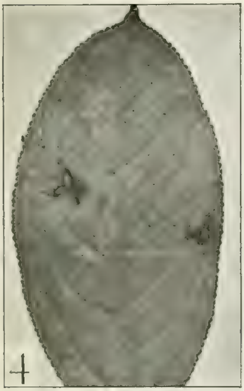
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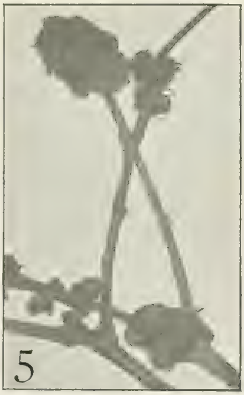
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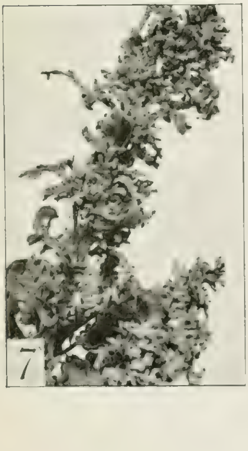
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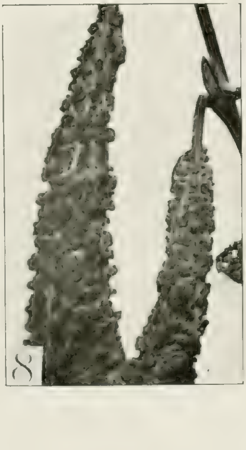
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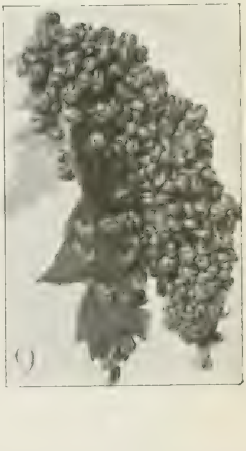
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Botany

Museum Bulletin 205–206

205–206 Report of the State Botanist 1917

New York State Museum Bulletin

Entered as second-class matter November 27, 1915, at the Post Office at Albany, New York, under the act of August 24, 1912

Published monthly by The University of the State of New York

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The University of the State of New York
New York State Museum

JOHN M. CLARKE, *Director*
HOMER D. HOUSE, *State Botanist*

REPORT OF THE STATE BOTANIST 1917

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REPORT OF THE STATE BOTANIST 1917

John M. Clarke
Director, Science Department

SIR:

I beg to communicate herewith my report on the work of the State Botanist's office for the fiscal year 1917.

Very respectfully
HOMER D. HOUSE
State Botanist

Scientific investigations. The investigative work of the State Botanist during the season of 1917 has been limited to a study of the flora of certain sections of the central and western counties of the State. Early in the season several days were spent in a study of the vegetation of southern Herkimer county, a region of numerous small lakes, bogs and swamps, and the home of several rare species of plants. A visit was also made to Fourth Lake in northern Herkimer county, and further investigations were made upon the vegetation of several sphagnum bogs through the counties of Oswego, Cayuga, Wayne, Seneca, Monroe and Genesee. At all the localities visited collections were made for the state herbarium.

A large number of fungi, ferns and flowering plants were collected during the year, many of which were new to the state flora. The ferns and flowering plants of particular interest are reported under "Local Flora Notes" and the fungi under "Notes on Fungi." A large number of fungi, some of recent collection, but most of them undetermined species collected by Doctor Peck and others, were studied and identified in collaboration with Prof. John Dearness and reported under "New and Interesting Species of Fungi."

Considerable progress has been made in the compilation of a list of New York fungi, which will also include an arrangement according to the host plants which they inhabit in the case of those saprophytic and parasitic species which are found upon definite hosts.

Memoir on the Wild Flowers of New York. The photographic work for this project was practically completed in 1916, and during the past year it was necessary to secure additional photographs of only a few subjects. The manuscript was completed in 1917 and there remains now only the completion of the engraving and printing. It is expected that this will be finished before the publication of this report. The great amount of detail connected with this undertaking has made it necessary to curtail to a large extent new investigations of a scientific nature.

Noteworthy contributions to the state herbarium. The chief additions to the state herbarium during the past year in the form of contributions and exchanges are presented in the following list of contributors, which also indicates the number of specimens received from each:

	SPECIMENS
Bonaparte Herbarium, Paris, France	245
Gray Herbarium, Harvard University	236
Prof. D. L. Crawford, Claremont, Cal	165
John Hurley, Little Falls	130
Prof. L. O. Overholts, State College, Pa	86
Dr James R. Weir, Missoula, Mont	53
Miss M. K. Smith, Estes Park, Col	35
E. P. Killip, Rochester	40
Dr J. J. Davis, Madison, Wis	22
Dr W. Haydon, Marshfield, Ore	20
A. H. Larson, Carter, Mont	20
Douglas M. White, Rochester	20
C. J. Musante, Tule River, Cal	16
S. H. Burnham, Hudson Falls	12
W. A. Matthews, Rochester	11
Roy Latham, Orient	10
Olaf O. Nylander, Caribou, Maine	10
Caroline C. Haynes, Highlands, N. J	9
James E. Barkeley, Grahamsville	2
Charlotte Bogardus, Coxsackie	1
Mrs E. P. Gardner, Canandaigua	1
Simon Davis, Brookline, Mass	1
F. V. Rand, Washington, D. C	1
Total	1146

Condition of the collections. With the aid of the assistant botanist, Louis Robbins, it has been possible to continue the rearrangement of the material in the herbarium, making it more accessible for study, and in addition to the mounting of the current collections, exchanges and contributions, a large number of valuable specimens of the Sheldon herbarium (presented in 1914) have been mounted and placed in the herbarium. Further progress in definitely marking the many type specimens has been made.

Additions to the herbarium. The number of specimens which have been added to the herbarium from all sources during the past year is 1457. Of these, 1146 were received in exchange or as contributions. Three hundred eleven specimens were collected by the staff in the counties of Albany, Cayuga, Erie, Essex, Franklin, Hamilton, Madison, Monroe, Nassau, Niagara, Oneida, Otsego, Ontario, Onondaga, Rensselaer, Saratoga, Seneca, Queens, Wayne and Warren. The number of species added which were new to the herbarium was 128, which includes 33 specimens of ferns and flowering plants of the northeastern states and 95 species of fungi.

Identifications. The State Botanist's office has been called upon to identify and report upon 437 specimens of plants, including many fungi. These identifications were asked for by 108 different persons.

PLANTS ADDED TO THE HERBARIUM

The policy of giving a detailed list of all species mounted and added to the state herbarium, which has characterized the State Botanist's reports for many years, is now discontinued, and the following list contains only the names of the species added to the herbarium during 1917 which were not hitherto represented in our collections. Of the many species of flowering plants received, which were new to our collections, only those from the northeastern United States are listed.

Ferns and Flowering Plants New to the Herbarium

Agalinis acuta *Pennell*
Agropyron acadiense *Hubbard*
Antennaria cana *Fernald*
“ neodioica gaspensis *Fernald*
Astragalus blakei *Eggleston*
Bidens colpophila *Fernald & St John*
“ eatonii kennebecensis *Fernald*
Carex oronensis *Fernald*
“ projecta x scoparia *Fernald*
“ tenuiflora x trisperma *Fernald*
Dryopteris goldiana x marginalis *Dowell*
Erechtites megalocarpa *Fernald*
Euphrasia americana *Wettst*
“ arctica *Lange*
“ purpurea *var.* farlowii (*Rob.*) *Fernald & Wiegand*
“ randii *Robinson*
Eriocaulon parkeri *Robinson*
Glyceria fernaldii (*Hitchc.*) *St John*
Juncus pervetus *Fernald*
Kobresia elachycarpa *Fernald*
Lactuca canadensis *var.* montana *Britton*
Lesquerella arctica *var.* purshii *Wats.*
Odontites odontites (*L.*) *Wettst.*
Pleurogyna rotata (*L.*) *Griesb.*
Proserpinacea intermedia *Mackenzie*
Puccinellia fasciculata (*Torr.*) *Bicknell*
“ alaskana *Scribn. & Merrill*
Salix glaucophylloides *Fernald*
Scirpus longii *Fernald*
Scutellaria churchilliana *Fernald*
Veronica teucrium *Linn.*
Xyris arenicola *Small*

Fungi New to the Herbarium

Aleuria rhenana *Fckl.*
Anthostoma peckii *D. & H.*
Anthostomella picaceum (*C. & E.*) *Sacc.*
Asterella fraxinina *D. & H.*
Asterstroma cervicolor (*B. & C.*) *Massee*
Aylographum onocleae *D. & H.*
Camarosporium dichomeroides *Brun.*
Catinula turgida *Desm.*
Ceracea corticicoides (*E. & E.*) *Pat.*
Ceratostoma avocetta (*C. & E.*) *Sacc.*
Cladosporium molle *Cooke*
Colletotrichum helianthi *Davis*
Coniophora vaga *Burt*
Corticium alutaceum (*Schrad.*) *Bres.*
“ atrovirens *Berk.*
“ centrifugum (*Lev.*) *Bres.*
“ confluens *Fries*
“ epigaeum *E. & E.*
“ pezizoideum *E. & E.*
“ polyporoideum *B. & C.*
“ scutellare *B. & C.*
“ stramineum *Bres.*
“ vagum *B. & C.*

Cylindrosporium ceanothi *E. & E.*
“ crataegi *E. & E.*
Dendrophoma variabilis *D. & H.*
Diaporthe artospora *D. & H.*
“ spiculosa (*A. & S.*) *Nitsch.*
Diatrypella minutispora *Dearness*
“ missouriensis *E. & E.*
Dimerosporium echinatum *E. & E.*
Dothiorella hicoriae *D. & H.*
Eutypa crustata (*Fr.*) *Sacc.*
Gloniella ovata (*Cooke*) *Sacc.*
“ parvulata *D. & H.*
“ vaccinicola *D. & H.*
Gloeosporium castanopsidis *D. & H.*
“ hedericolum *Maublanc*
Glonium pruni *D. & H.*
Glutinium exasperans *Fries*
Gymnosporangium kernianum *Bethel*
Helicosporium nymphaearum *Rand*
Humaria peckii *House*
Hypochnus olivascens (*B. & C.*) *Burt*
“ spongiosus (*Schw.*) *Burt*
“ subferruginosus *Burt*
“ subvinosus *Burt*
Illosporium coccinellum *Cooke*
Labrella celastri *D. & H.*
Laestadia caricis *D. & H.*
“ smilaciniae *D. & H.*
Leptothyrium castanicolum *E. & E.*
Leptostromella chenopodii *D. & H.*
Leptosphaeria acuta (*M. & N.*) *Karst.*
Lophiostoma insidiosum (*Desm.*) *C. & E.*
Macrophoma ulmicola *Dearness*
Melanomma inspissum (*Schw.*) *Cooke*
Metasphaeria squamata (*C. & E.*) *Sacc.*
Midotis irregularis (*Schw.*) *Sacc.*
Mycena filopes (*Bull.*) *Quel.*
Mycosphaerella opuntiae (*E. & E.*)
Mytilidion fusisporum (*Cooke*) *Sacc.*
Nigredo occidentalis (*Diet.*) *Arth.*
Odontia nivea (*Karst.*)
Ovularia bistortae (*Fckl.*) *Sacc.*
Peniophora affinis *Burt*
“ arachnoidea *Burt*
“ laevis (*Fr.*) *Burt*
“ peckii *Burt*
“ pubera (*Fr.*) *Burt*
“ praetermissa (*Karst.*) *Burt*
“ sordida *Karst.*
“ velutina (*DC.*) *Cooke*
Phlyctaena arcuata *Berk.*
Phragmidium occidentale *Arth.*
Phyllosticta alcides *Sacc.*
“ amicta *E. & E.*
“ gaultheriae *E. & E.*
“ omphaleae *D. & H.*
“ salicicola *Thum.*
“ tiarellae *Dearness*
Pseudoplectania nigrella (*Pers.*) *Fckl.*
Puccinia epilobi-tetragonis (*DC.*) *Wint.*
“ seymouriana *Arth.*
“ veronicarum *DC.*
Puccinastrum sparsum (*Wint.*) *Ed. Fisch.*
Ramularia aequivoca (*Ces.*) *Sacc.*
Rhizopogon occidentalis *Zeller & Dodge*
Rosellinia obtusissima (*B. & C.*) *Sacc.*
Scleroderris fuliginosa (*Pers.*) *Karst.*
Scolectotrichum cardui *Schroet.*
Septoria araliae *E. & E.*
“ hedeomae *D. & H.*
Sphaeropsis ellisii *Sacc.*
“ hedericola (*Speg.*) *Sacc.*
Sporodesmium naviculum *D. & H.*
Stereum erumpens *Burt*
“ ochraceoflavum *Schw.*
Tympanis buchsii (*Henn.*) *Rehm*
“ laricina (*Fckl.*) *Sacc.*
Valsa variolaria (*Schw.*) *Cooke*
Valsaria toxici (*Schw.*) *Sacc.*
Vermicularia sambucina *E. & D.*
Winterina crustosa *E. & E.*

A SMALL COLLECTION OF PLANTS FROM CENTRAL NEW YORK, COLLECTED BY DR ASA GRAY, 1832

A small but most interesting and valuable addition to the state herbarium during the past year, consists of a collection of about 130 specimens of plants collected and carefully labeled by Dr Asa Gray in 1832. They appear to have been collected chiefly near Utica. The following letter from the donor, Mr John Hurley, president of the New York State Board of Pharmacy, contains all that is known of their history.

Little Falls, N. Y.
May 7, 1917

John M. Clarke, Ph. D.
Director's Office, Education Bldg.
Albany, N. Y.

My dear Sir:

Your letter of May 4th at hand Saturday morning, and it gives me great pleasure to note that the botanical collection sent you met with your hearty approval.

I would state that some fifteen years ago my partner, Mr O'Rourke, purchased a house and lot for a residence for himself (in Little Falls), and while doing some repairs to that house I strolled into the attic one day and I noticed a bundle on the floor wrapped in a newspaper. I brought the same to the store and upon investigation it was found to contain the botanical specimens just as I sent it to you.

In the 1830's, this house was owned and occupied by one Mr William Brooks, a prominent lawyer and a man possessed of some money. Mr Brooks had two sons, one William jr, the other Thaddeus. Dr Asa Gray, who at that time resided in Utica, was a great friend of William Brooks jr and made many visits to his home in this city. From the Brooks homestead he would roam over the hills and mountains taking in places like Richfield Springs, Cherry Valley, Paine's Hollow and other places surrounding Little Falls, for the purpose of collecting specimens of botanical herbs.

On many of these occasions William Brooks jr would accompany Professor Gray on his exploring trips searching for new and fresh specimens. There is no doubt but that Professor Gray intended to transport these specimens to his original collection in the city of Utica, and of course why they were left in the Brooks home, there is no one left of that family to tell the story. The Brooks family, consisting of two brothers and two sisters, have passed away.

However, the neighbors remembered very well the circumstances of the visits and stays of Professor Gray with the Brooks family. These specimens were collected while Professor Gray was a teacher in the city of Utica, and were in the Brooks house from the time they were dated until some fifteen years ago when Mr O'Rourke purchased the residence for a home for himself and sisters. Since that time I have had them in my possession.

I trust that this information will cover your inquiry, and I assure you that if there is anything further that I can tell you about this collection I will be only too glad to do so and to assist you in every way possible. Hoping that this will prove satisfactory, with my kindest regards, I am,

Very truly yours

John Hurley

The inference to be drawn from this letter to Doctor Clarke, that the plants were collected near Little Falls and inadvertently left in the Brook's house, is not borne out by the labels accompanying the specimens. All excepting about a dozen were collected at or near Utica during the month of May 1832. A very few were collected at Little Falls, Paris and other localities.

A glance at the list of species, shows that the bundle contained a fairly representative collection of plants which bloom during May in the vicinity of Utica, and it is quite possible that the collection represents a set of common flowering plants of that season which Professor Gray presented to some member of the Brooks family. This assumption is further borne out by the fact that the specimens are not very ample, but just a small or fairly good specimen of each species. There are also very few duplicates and very few rare species, if we except Collinsia verna, which in those days was said to be common near Utica, but is now a rare plant in our flora.

Following is a list of the species represented, using the names of current botanical literature:

Actaea alba
  “ rubra
Acer spicatum
Anemone quinquefolia
  “ canadensis
Arisaema triphyllum
Asplenium felix-foemina
Bicuculla cucullaria
Capnoides sempervirens
Carex bullata
  “ bromoides
  “ crinita
  “ deweyana
  “ diandra
  “ folliculata
  “ flexuosa

Carex flava
  “ festucacea
  “ granularis
  “ canescens
  “ gracillima
  “ swanii
  “ hystricina
  “ hirtifolia
  “ echinata
  “ laxiflora
  “ lasiocarpa
  “ lupulina
  “ livida
  “ leptalea
  “ lacustris
  “ oligocarpa

Carex platyphylla
“ prasina
“ pallescens
“ careyana
“ rosea
“ retrorsa
“ scabrata
“ schweinitzii
“ scoparia
“ scirpoidea
“ trisperma
“ trichocarpa
“ tribuloides
“ stricta
“ umbellata
“ pseudo-cyperus
“ varia
“ vulpinoides
Carpinus caroliniana
Caltha palustris
Cardamine bulbosa
“ pennsylvanica
Caulophyllum thalictroides
Clintonia borealis
Cornus alternifolia
“ canadensis
“ stolonifera
Coptis trifolia
Cypripedium parviflorum
“ pubescens
“ reginae
Collinsia verna
Dryopteris cristata
Dentaria diphylla
Eriophorum alpinum
Fragaria virginica
Geum rivale
Floerkea proserpinacea
Galium trifidum
Hamamelis virginiana
Hepatica acutiloba
Hydrophyllum virginicum
Isotria verticillata
Ilex verticillata
Juglans cinerea
Kalmia polifolia
Lithospermum arvense
Linnaea americana
Lonicera dioica
“ oblongifolia
Lemna trisulca
Juncoides campestris
Medeola virginica
Mitella diphylla
“ nuda
Memyanthes trifoliata
Minulus ringens
Galeorchis spectabilis
Panax trifolia
Osmunda cinnamonea
“ claytoniana
Prunus virginiana
“ serotina
Pyrola secunda
“ uliginosa
Prunus pennsylvanica
Ranunculus pennsylvanicus
Phlox divaricata
Platanus occidentalis
Ribes americanum
Streptopus roseus
Samolus floribundus
Senecio aureus
Scutellaria galericulata
Sambucus pubens
Trientalis borealis
Trillium erectum
“ grandiflorum
“ undulatum
Tsuga canadensis
Tiarella cordifolia
Unifolium canadense
Vagnera racemosa
“ stellata
Veronica officinalis
“ scutellaria
Viburnum alnifolium
Valerinella radiata
Uvularia grandiflora
Viola canadensis
“ pubescens
" cucullata
“ conspersa
Vagnera trifolia
Washingtonia claytoni

The most interesting species represented in this package are the following:

Carex platyphylla Carey, near Utica, June 1832 (as Carex anceps).

Carex oligocarpa Schk., Frankfort, Herkimer county, June 1832.

Carex careyana Torrey, near Utica, June 1832 (as Carex plantaginea).

Carex swanii (Fernald) Mackenzie, Oriskany, Oneida county, June 29, 1832 (as Carex hirsuta).

Carex livida (Wahl.) Willd., Oriskany swamp, June 29, 1832.

Carex deweyana Schw., near Utica, June 1832.

Collinsia verna Nutt., Utica, May 1832. This from Oneida county is new to the state herbarium although we have specimens of it from outside the State. Paine states that it occurs on wet meadows on the flats of the Mohawk, just below Utica and on the borders of a small pond near Utica (Kneiskern). He also cites Gray's collection and one from Ithaca (Aiken). The latter specimen is in the Beck herbarium in the State Museum. J. V. Haberer,[1] who has contributed much of value to our knowledge of the flora of central New York, does not mention this species in his notes on the Plants of Oneida County and Vicinity and I assume that he has not rediscovered this plant, which seems to have been known only to Kneiskern and Gray.

---

[1] Rhodora, 7: 92–97; 106–10. 1905.

NOTES ON LOCAL FLORAS V

Anchistea virginica (Linnaeus) Presl.

(Woodwardia virginica *Smith*)

A common fern in the coastal region but considered rare or local in other parts of the State. It is known, however, from numerous localities in the central part of the State and its extreme northern range is apparently indicated by a collection from a dry sphagnum bog near the Grass river at Canton, St Lawrence county (Mrs Orra Parker Phelps, August 24, 1916) and Beaver lake, Lewis county (B. D. Gilbert).[1] In Oneida county it has been collected in the swamps of Rome by Paine[2] (p. 176) and at Sylvan Beach by H. D. House.[3] Paine also reports it from Wetmore's pond on Frankfort Hill, Herkimer county, and from Junius, Seneca county, where it has also been collected by Peck. In Oswego county it occurs in a bog 3 miles east of Phoenix (H. D. House, August 13, 1915), and at Kasoag (Peck). In Onondaga county it is found in Cicero swamp (H. D. House, August 15, 1916). Westward it is not so frequent, but occurs in the bogs at Mendon, Monroe county (H. D. House, July 5, 1917) and at Adams Basin (Baxter[4] p. 131). It is also reported from Counterfeiter's ledge, Akron, Erie county, and Cassadaga, Chautauqua county, by Day[5]. In the southern tier of counties it is reported from 10 miles north of Binghamton by Clute[6] and from Machias, Cattaraugus county, by Fenno[7].

Polystichum braunii (Spenner) Fee

This rare fern, well known in the Catskill region, was first found in the Adirondacks by Professor Peck[8] in 1871, on the base of Bartlett mountain near Lower Ausable lake, Essex county, where it has again been recently collected (E. P. Killip, July 24, 1917). Lower Ausable lake is not in North Elba and hence this fern does not appear in Peck's list of North Elba plants, but it has more recently been reported from North Elba by Edgar Tweedy[9]. In Warren county it has been found by Mrs E. Watrous near Hague (July 15, 1907). These constitute the known Adirondack localities.

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[1] Torrey Bot. Club Bul. 6, p. 363. 1879.

[2] J. A. Paine jr. Catalogue of the Plants of Oneida County and Vicinity, 18th Ann. Rep't Regents, 1865.

[3] Torreya, 3: 166. 1903.

[4] Beckwith, Macauley & Fuller. Plants of Monroe County and Vicinity. 1896. First Supplementary List by Beckwith, Macauley & Baxter. 1910.

[5] D. F. Day. Catalogue of the Native and Naturalized Plants of the City of Buffalo and Vicinity (Buffalo Soc. Nat. Sciences Bul. 4, 1882). Reprinted and repaged. 1883.

[6] Torrey Bot. Club Bul. 23, p. 424. 1896.

[7] N. Y. State Mus. Bul. 67, p. 51. 1903.

[8] 24th Rep't N. Y. State Mus., p. 101. 1872.

Lycopodium clavatum var. brevispicatum Peck

Summit of Black Bear mountain, near Inlet, Hamilton county (H. D. House, June 26, 1917). The type of this interesting variety of club moss was collected by Peck[10] on Wallface mountain, July 17, 1900. It has also been reported from White Lake, Oneida county, by Haberer[11].

Selaginella rupestris (Linnaeus) Spring

On rocky ledges, Glenmont, Albany county (H. D. House, September 12, 1917). The various collections and published reports of this small fern ally indicate that it is rather local. Paine[2] (p. 181) reports it only from Little Falls and Alexandria Bay. Day[5] (p. 92) reports it from the cliffs of the Niagara river and in the Plants of Monroe County[4] (p. 134) it is recorded by M. S. Baxter from dry sandy barrens at Penfield, a rather unusual habitat for the species but which has also been noticed by Burnham and Latham[12] at Orient Point on Long Island. It has also been collected at Troy by E. C. Howe and at Little Falls by Haberer.

Ammophila arenaria (Linnaeus) Link

Common on the sandy fields and banks bordering Lake Ontario near Round pond, Monroe county (H. D. House, July 3, 1917). Paine[2] (p. 167), reports this grass from here stating that it is "abundant . . . over the long bars against Round pond, Long pond, Cranberry pond and Braddock's bay, covering the ridges of clear sand," etc.

Panicularia grandis (S. Watson) Nash

Penfield, Monroe county (M. S. Baxter, August 13, 1916). Marsh near Pittsford, Monroe county (H. D. House, July 5, 1917). Apparently an uncommon species of grass but widely distributed in this State, having been collected at Apullia, Onondaga county (H. D. House, August 13, 1916), Lake Placid, Essex county (H. D.

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[9] N. Y. State Mus. Bul. 167, p. 36. 1913.
[10] 54th Rep't N Y. State Mus., p. 162. 1901.
[11] Rhodora, 7: 96. 1905.
[12] Torreya, 14: 230. 1914.

House, September 7, 1917), and near Gloversville, Fulton county (A. Olsson June 29, 1912).

Eleocharis intermedia habereri Fernald[13]

Muddy banks of the Hudson river at Glenmont, Albany county (H. D. House, September 12, 1917). The type of this variety was collected on the shores of Oneida lake by J. V. Haberer (no. 1149a, Vienna, Oneida county, August 2 and 18, 1900). Haberer's specimen numbered 1149a in the state herbarium is from Lewis Point, Madison county.[14] The writer has observed, however, that this variety is frequent on the shores of all four counties which border on Oneida lake.

Carex aquatilis Wahlenberg

Marsh on the edge of Round pond, Monroe county (H. D. House, July 3, 1917).

Carex buxbaumii Wahlenberg

On an open marsh near Mendon, Monroe county (H. D. House, July 2, 1917), growing with Carex stricta Lam., Carex lasiocarpa Ehrh., Carex leptalea Wahl., Carex diandra Schrank and Juncus balticus Willd.

Carex livida (Wahlenberg) Willdenow

Mendon marsh, Mendon, Monroe county (E. P. Killip, July 10, 1917). Paine[2] (p. 159) reports this rare sedge from the East dry-lots swamp near Jerusalem hill, Litchfield, southern Herkimer county, and also says that it formerly occurred in Oriskany swamp, Oneida county. There is a specimen collected in Oriskany swamp by Asa Gray in June 1832, in the state herbarium. Peck[15] and also Haberer have recollected this species in the state marsh near Litchfield. Sartwell's Carices Americae Septentrionalis contains Carex livida (no. 66) from Oneida (Vasey), Kneiskern also seems to have collected it at Oneida (state herbarium), both probably from Oriskany swamp.

Carex albursina Sheldon

Palmer's glen, Rochester, Monroe county (H. D. House, July 5, 1917). Peck[16] has reported this sedge under the name of Carex laxiflora Lam. var. latifolia Boott, from the Helderberg mountains and Sanford's Corners, Jefferson county.

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[13] Rhodora, 8: 130. 1906.
[14] N. Y. State Mus. Bul. 116, p. 35. 1907.
[15] 50th Rep't N. Y. State Mus., p. 127. 1897.
[16] 47th Rep't N. Y. State Mus., p. 17. 1894.

Carex shriveri Britton

Moist meadows near Albany (H. D. House, July 30, 1917). Also reported by Peck[17] under the older name of Carex haleana Olney (not Dewey), from Meadowdale, Albany county.

Carex tuckermani Dewey

Edge of marsh near Old Forge, Herkimer county (H. D. House, June 28, 1917).

Xyris montana H. Ries[18]

Paine in his catalog of Oneida county plants[2] (p. 146) first reported this characteristic Adirondack species under the name of Xyris bulbosa Kunth, from "muddy edges of an elevated pond at the east end of Bald rock, northern Herkimer county." This locality was rediscovered by E. P. Killip in 1916. In Gray's Manual (ed. 5, p. 548; 1868), the plant is designated as Xyris flexuosa var. pusilla Gray. It was reported[19] in 1873 from "borders of a pond in southern Hamilton county," and Dr C. H. Peck[20] reported it from the "cranberry marsh," Sandlake, Rensselaer county.

Around the edges of ponds and lakes in northern Oneida county the species is rather frequent. Dr J. V. Haberer[21] reports it from White lake, Round lake, Deer pond and Beaver meadows near North Wilmurt (Herkimer county). He also describes a form bracteosa.

Recent collections in the state herbarium are from Saranac Lake (Peck), Bellow's lake, Fulton county (C. P. Alexander) and Long Lake, Oneida county (H. D. House and E. P. Killip, August 9, 1917).

Heteranthera dubia (Jacquin) MacMillan

Shore of Oneida lake near the mouth of Oneida creek (H. D. House, August 19, 1917). Also collected here in 1902. Paine[2] (p. 146) reports this species from near Utica, Unadilla river (Gray), Eaton, Madison county (Bradley), Junius, Seneca county (Sartwell), Genesee river and Irondequoit bay (C. M. Booth).

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[17] 45th Rep't N. Y. State Mus., p. 30. 1893.

[18] Torrey Bot. Club Bul. 19, p. 38. 1892.

[19] Torrey Bot. Club Bul. 4, p. 25. 1873.

[20] 22d Rep't N. Y. State Mus., p. 103. 1869. N. Y. State Mus. Bul. 94, p. 35. 1905.

[21] Rhodora, 7: 94. 1905. N. Y. State Mus. Bul. 105, p. 36. 1906.

Juncus dudleyi Wiegand

Bergen swamp, Genesee county (H. D. House, July 4, 1917). Castle swamp, Oneida, Madison county (H. D. House, June 30, 1917). Sandy fields, Sylvan Beach, Oneida county (H. D. House, August 17, 1917). Near Gloversville, Fulton county (A. Olsson, June 29, 1912).

These localities are additions to the known range of this species in New York State, cited by Wiegand[22]. Peck[23] also reports it from Marl creek near Cortland and in the state herbarium is a specimen collected by Peck at Amagansett, Long Island. The species is usually found in marl bogs, but the Sylvan Beach and Amagansett specimens were growing in pure sand.

Juncus filiformis Linnaeus

Avalanche pass, Adirondack mountains (Douglas M. White, July 27, 1917). Peck has collected this rare species in the Adirondack region at Morehouseville, Rainbow lake and on Mount Marcy. Paine[2] (p. 144) reports it from the head of Oneida lake upon the authority of Gray and near Sackett Harbor, also upon Gray's authority.

Juncus torreyi Coville[24]

(J. nodosus var. megacephalus *Torrey*)

Olcott Beach, Niagara county (H. D. House, August 13, 1917). Johnstown, Fulton county (A. Olsson, September 13, 1913). Charlotte, Monroe county (L. Holzer, July 1864, who makes this interesting note upon the label " I should make this a distinct species from nodosus"). Holzer's collection is cited by Paine[2] (p. 145) and Torrey[25] (p. 326) describes it as a variety from specimens collected by Asa Gray on the shores of Lake Ontario.

Streptopus amplexicaulis (Linnaeus) DeCandolle

Swamps near Jordanville, Herkimer county (H. D. House, June 24, 1917). A rather frequent species throughout the Adirondack region having been collected by Peck at Loon Lake, Franklin county, and at Chapel pond and head of Cascade lake, Essex county. Peck also collected it at Jordanville and Paine[2] (p. 143) reports it as occurring in most of the swamps of the high hills of southern Herkimer county.

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[22] Torrey Bot. Club Bul. 27, p. 524. 1900.

[23] 54th Rep't N. Y. State Mus., p. 143. 1901.

[24] Torrey Bot. Club Bul. 22, p. 303. 1895.

[25] John Torrey, Flora of New York, 2 v. 1843.

Criosanthes arietina (R. Brown) House

(Cypripedium arietinum *R. Brown*)

With one exception, the records of this rare orchis are limited to localities in central New York. That exception is a collection made near Hague, Warren county, by Mrs E. Watrous[26]. Paine[2] p. 190) reports it from Summit lake, Otsego county, Jordanville (southern Herkimer county) and near Oneida lake (Gray). He also states that it was formerly found near the Plattekill, Schenectady county. Mrs M. O. Rust[27] records it from Cicero swamp, Onondaga county, and H. D. House[28] cites specimens collected near Syracuse (Beauchamp), Cicero swamp (House), and Mud lake near Jordanville (Haberer).

It was recently seen and collected in a swamp just south of Jordanville (H. D. House and E. P. Killip, June 24, 1917). Many years ago B. D. Gilbert[29] found in the swamp at Summit lake, Otsego county, a pure white-flowered form which may be designated as *Criosanthes arietina* forma *albiflora*.

Perularia flava (Linnaeus) Rydberg

Moist meadows near Long pond, Monroe county (H. D. House, July 3, 1917), growing in company with the common green orchis (Limnorchis hyperborea), which it greatly resembles.

Lysiella obtusata (Pursh) Rydberg

Moist woods near Cohasset on Fourth lake, northern Herkimer county (H. D. House, June 27, 1917). This is not far from the only locality reported by Paine[2] (p. 135) "mossy springy banks between Third lake and Bald rock." Peck has collected this rare orchis on Whiteface mountain and near North Elba.

Blephariglottis grandiflora (Bigelow) Rydberg

Grassy swamp east of the Wood farm, North Elba (E. P. Killip, July 29, 1917). Perhaps the same locality as reported by Peck[30].

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[26] N. Y. State Mus. Bul. 122, p. 132. 1908.
[27] Torrey Bot. Club Bul. 10, p. 67. 1883.
[28] Torrey Bot. Club Bul. 32, p. 374. 1905.
[29] 22d Rep't N. Y. State Mus., p. 103. 1869.
[30] N. Y. State Mus. Bul. 167, p. 35. 1913.

This beautiful fringed orchis is not rare in the Adirondack region although published reports of its distribution are few. It occurs in an old beaver meadow near Fourth lake, Herkimer county (House and Killip, 1917) and Dr J. V. Haberer[11] (p. 95) reports it from White lake outlet and from the headwaters of Black river near North lake.

Arethusa bulbosa Linnaeus

Apparently as abundant throughout the northern, central and western portions of the State as it is upon the sandy coastal plain, although more locally distributed. Paine[2] (p. 137) reports it from Schenectady (Pearson), near Utica and in the Oriskany swamp (Gray), beyond Fort Bull, Junius, Seneca county (Sartwell) and in Bergen swamp. In Bergen swamp, Genesee county, it is very abundant. It was collected there by H. D. House and E. P. Killip and also at Lily marsh, South New Haven, Oswego county, Mud lake near Hannibal, Oswego county, and at Mud pond, near Zurich, Wayne county. It was also collected at Lily marsh by C. S. Sheldon (July 5, 1877, state herbarium). The Lodi swamp locality at Syracuse reported by J. H. Wibbe[31], and by H. D. House[32], no longer exists.

Ophrys australis (Lindley) House

(Figure 1)

Sphagnum bog surrounding Mud pond, near Zurich, Wayne county (H. D. House and E. P. Killip, July 2, 1917). The distribution of this rare orchis in New York has been previously referred to by the writer.[33] Recent collections, however, of this and other species of the same genus seem to indicate the rather interesting fact that they are all known chiefly from regions outside the Adirondack and Catskill mountains. In fact I can find no records of any species of Ophrys (Listera) in the Catskill mountains; and of the many records for Ophrys cordata, only two are in Essex county, while the third species, Ophrys convalarioides, has been found only at Turin, Lewis county[34] and at Newport, Herkimer county[28] (p. 380), neither locality within the Adirondack mountains, although Mrs A. M. Smith[35] reports it from the Adirondack League Club tract.

The first record of Ophrys australis in New York was made by the late Rev. Hermann Wibbe[36] who found it in the " Lily marsh " at South New Haven, Oswego county, on June 15, 1878. It has since been collected there by Charles S. Sheldon (June 27, 1879, state herbarium) and by H. D. House and E. P. Killip (July 1, 1917). H. D. House[28] (p. 380) cites collections from near Baldwinsville, Onondaga county (Beauchamp, Underwood, O. E. Pearce and others). It was collected at Fine, St Lawrence county, by Peck and at Canada lake, Fulton county, by C. P. Alexander and A. Olsson[33]. In 1894, W. W. Rowlee[37] collected it at East Palermo, Oswego county.

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[31] Torrey Bot. Club Bul. 10, p. 46. 1883.

[32] Torreya, 3: 52. 1903.

[33] N. Y. State Mus. Bul. 176, p. 26. 1915.

[34] 38th Ann. Rep't N. Y. State Mus., p. 83. 1885.

[35] Annie Morrill Smith. List of Plants Found on the Adirondack League Club Tract, p. 52.

In 1916 it was collected in a bog east of Duck lake, Conquest, Cayuga county, by L. Griscom[38], A. A. and A. H. Wright, F. P. Metcalf, K. M. Wiegand and L. H. MacDaniels, and near Victory, Cayuga county, by L. Griscom, A. A. and A. H. Wright, F. P. Metcalf and K. M. Wiegand.

Ophrys cordata Linnaeus

(Figure 1)

The accompanying map which shows the distribution of the three species of Ophrys in New York indicates this as the most abundant and widely distributed species in this State. There are few local floras which do not record it, among them being Dudley's Cayuga Flora.

Paine[2] (p. 137) reports it from southern Herkimer county, flats of the Mohawk valley, swamps west of Rome, Paris hill and southern Oneida county (Gray). F. V. Coville[39] reports it from Smithville, Chenango county, and this with a record from Unadilla Forks are cited by Clute[40] (p. 104). Day[5] (p. 76), records it from three localities in the western counties, and in the Plants of Monroe County and Vicinity[4] it is reported only from Bergen swamp, Genesee county, where it was again collected by W. W. Rowlee[37] and also by H. D. House, M. S. Baxter and E. P. Killip (July 4, 1917).

Mrs Goodrich[41] reports it from near Clay, Onondaga county (p. 72) and Gordinier and Howe[42] record it from Rensselaer county.

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[36] Torrey Bot. Club Bul. 6, p. 192. 1877 and 31st Ann. Rep't N. Y. State Mus., p. 31. 1879.

[37] W. W. Rowlee. Revision of the Genus Listera. Torrey Bot. Club Bul. 26, p. 165. 1899.

[38] F. P. Metcalf & L. Griscom. Rare New York State Plants. Rhodora, 19: 52. 1917.

[39] Torrey Bot. Club Bul. 12, p. 53. 1885.

[40] W. N. Clute. Flora of the Upper Susquehanna. 1898.

[41] Mrs L. H. H. Goodrich. Plants of Onondaga County. 1912.

[42] Gordinier & Howe. Flora of Rensselaer County. 1894.

H. D. House[28] (p. 378) cites other localities in central New York including Syracuse (Underwood), Baldwinsville (Beauchamp) and Fenner, Madison county (Underwood).

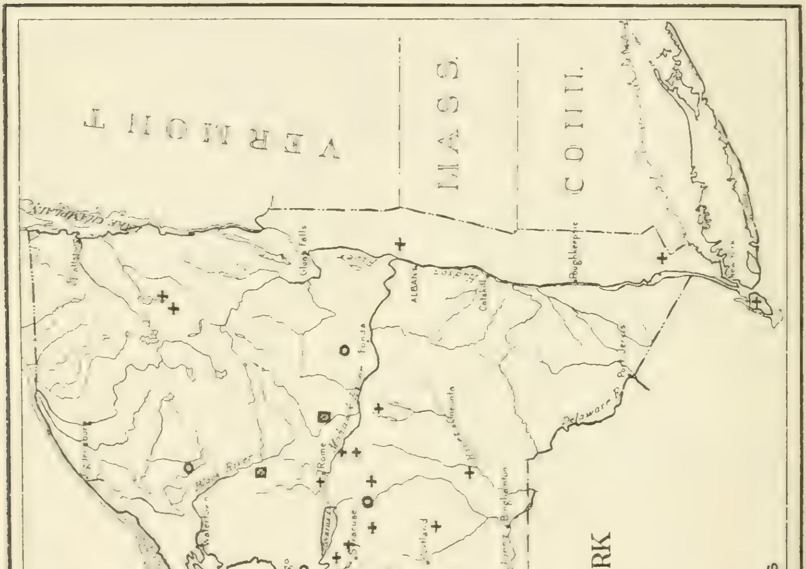

Fig. 1 Distribution of the genus Ophrys in New York

In southern New York the species is rare. Hollick and Britton[43] report it from Staten Island on the basis of an old specimen in the Elliot collection, and the record of "Listera convallarioides Hook." in O. R. Willis's[44] Flora of Westchester County (p. 815), in all probability refers to this species.

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[43] Hollick & Britton. Flora of Richmond County. 1879.

Corallorrhiza corallorrhiza (Linnaeus) Karsten
(C. trifida *Chatelain*)

Cedar swamp near Jordanville (H. D. House and E. P. Killip June 24, 1917). It has also been collected here by Peck (state herbarium) and Paine[2] (p. 138) records it from Trenton Falls, cedar swamps of the Mohawk flats near Utica, Paris hill, Hidden lake, Jordanville and Mud lake (the last three in Herkimer county). House[45] reports it from Baldwinsville (Beauchamp) and from Syracuse, Onondaga county (Underwood). In northern New York, Peck has collected this small orchis at Lake Placid and North Elba[46], Elizabethtown[47], Fine, St Lawrence county, and Sageville.

Myrica carolinensis Miller

This dwarf species of wax myrtle is very abundant on the sandy coastal plain of Long and Staten Islands and has been reported up the Hudson valley as far as Cold Spring, Putnam county, by Peck[48]. Its occurrence in several marl bogs throughout western New York has long been known and, along with several other coastal plain species found on the Ontario lowlands, indicates a relationship between the vegetation of the two regions.

Early reports all refer to this species as Myrica cerifera. Paine[2] (p. 127) reports it from Junius (Sartwell), Seneca county, Rochester (Chester Dewey), Parma (Bradley) and the swamps of West Bergen. G. W. Clinton[49] reports it from Caledonia. Numerous collections have been made at the Bergen swamp locality by M. S. Baxter, C. H. Peck, E. P. Killip, H. D. House (July 4, 1917) (June 2, 1916) and others. At Junius it has also been collected by Peck and by H. D. House (August 10, 1917).

Persicaria careyi (Olney) Greene

Marsh near Albany (H. D. House, July 30, 1917). Peck[50] records this species from Minnewaska and the state herbarium also contains specimens collected at Tappan (C. F. Austin), Fulton county (C. P. Alexander) and Wading river (Young)[51]. Paine[2] (p. 121) reports it from Summit lake, Otsego county, and Mud lake, southern Herkimer county.

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[44] O. R. Willis. Flora of Westchester County (Bolton's History of Westchester County, p. 771–826). 1881. Reprinted and repaged.

[45] Torreya, 3: 54. 1903.

[46] N. Y. State Mus. Bul. 157, p. 38. 1912.

[47] N. Y. State Mus. Bul. 28, p. 130. 1899.

[48] 25th Rep't N. Y. State Mus., p. 107. 1873.

[49] 19th Ann. Rep't Regents, p. 79. 1866.

[50] 53d Rep't N. Y. State Mus., p. 852. 1900.

Ranunculus delphinifolius Torrey[52]

Golah, Monroe county (E. P. Killip, June 15, 1917). This is apparently the variety α of R. purshii in Paine's catalogue[2] (p. 54), where the species is reported from marshes east of Onondaga lake, and along the shore of Lake Ontario at Sodus bay (p. 182). Beck and Tracy[53] (as R. lacustris) report it from "near Lansingburg and near Lewiston," while the Beck herbarium contains a specimen from near Albany and one from Rochester (Bradley).

In the Monroe county flora[4] (p. 42) it is reported from West Henrietta, Chili, Gates and Wayne county. Gray[54] reports it from near Watertown, and it has been collected at Ithaca (C. S. Sheldon, 1880), Albany (Peck) and Rossie, St Lawrence county (Peck, June 14, 1909). In southern New York it is reported from Wading River by E. S. Miller[55] and from Orient by Burnham and Latham[56], from Staten Island by Hollick and Britton[57].

The true Ranunculus purshii Richards. (Frank. Jour., p. 741; 1823) is referred to by Paine (p. 54) as variety β while his variety γ is quite certainly the so-called variety terrestris of Ranunculus delphinifolius.

Aquilegia vulgaris Linnaeus

The European columbine is an occasional escape near dwellings but in southern Herkimer county it has become in certain localities a very common weed, especially in old fields and in pastures. When in full bloom (June 24, 1917) it is very conspicuous.

Asimina triloba (Linnaeus) Dunal

The papaw, which is rather abundant throughout the southern states, is known in New York State from only a few localities in the western counties. Recently collected in an old field near the New York Central Railroad about 2 miles east of Brockport, Monroe county (H. D. House, August 15, 1917).

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[51] 27th Rep't N. Y. State Mus., p. 112. 1877.
[52] Eaton. Manual, ed. 2, p. 395. 1818.
[53] Beck & Tracy in N. Y. Med. & Phys. Jour., 2: 112. 1823.
[54] Ann. Lyc. Nat. Hist. N. Y., 3: 221. 1836.
[55] Torrey Bot. Club Bul. 6, p. 258. 1878.
[56] Torreya, 14: 241. 1914.
[57] Torrey Bot. Club Bul. 18, p. 213. 1891.

Paine[2] (p. 57) cites Greece and Parma, Monroe county (Bradley), shore of Lake Erie near Barcelona (Kneiskern). In the Monroe county flora the Brockport locality is credited to Prof. W. H. Lennon and it is also reported from Adams Basin by Baxter. Day[5] (p. 15) reports it from Sturgeon Point, Erie county (C. H. Williams), Lockport and Middleport, Niagara county (James Hall), mouth of Chautauqua creek (Kneiskern) and Medina, Orleans county (Dr Hugo Schmidt).

It is interesting to note here that adult specimens of the butterfly (Iphiclides ajax telamonides), the larvae of which feeds upon the papaw, have been taken on the flowers of the fireweed (Chamaenerion angustifolium) in North Elba[58], Essex county, along the road to Keene, at an altitude of about 2000 feet, on July 17, 1912. The papaw is unknown in this region and so far as we know does not occur nearer than Monroe county or New Jersey, but it is possible that the larvae of ajax has other food plants than the papaw.

Radicula hispida (Desvaux) Britton

On the sand bar between Braddock's bay and Lake Ontario, Monroe county (H. D. House, July 3, 1917).

Polanisia graveolens Rafinesque

Along sand bars of the Hudson river near Wemple, Albany county (H. D. House, September 29, 1917). This has been previously reported from the banks of the Hudson below Garrisons by J. S. Merriam[59] and at Peekskill[60] by S. B. Mead. Paine (p. 62) reports it from Schenectady (Pearson), Oneida lake (Vasey), Cayuga Bridge (Bradley), Crooked lake (Sartwell). It is also recorded from near West Point by W. W. Bailey[61] and George W. Clinton[62] mentions collections of it from Kings county made by Smith and Leggett. The state herbarium also contains specimens of this rather local species from Seneca lake (Gray), Owasco lake

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[58] F. E. Watson & L. V. Coleman in Brooklyn Entomological Soc. Bul. 8, p. 4-6. Oct. 1912.

[59] Torrey Bot. Club Bul. 3, p. 38. 1872.

[60] Torrey Bot. Club Bul. 3, p. 40. 1872.

[61] Torrey Bot. Club Bul. 13, p. 60. 1886.

[62] 19th Rep't Regents, p. 204. 1866.

(Sheldon, 1879) and Barcelona, on shore of Lake Erie (J. R. Churchill, August 11, 1896).

Potentilla paradoxa Nuttall

Very abundant on the sand bar at the outlet of Braddock's bay, Monroe county (H. D. House and E. P. Killip, July 3, 1917). This locality has long been known as one of the few stations in this State where this rare species of five-finger grows. It was first recorded from here by Paine (p. 186) and later by Dr N. L. Britton[63]. It has also been collected at Fair Haven, Cayuga county, by Charles S. Sheldon (July 30, 1880) and at Sodus Bay by E. L. Hankenson (state herbarium). J. F. Cowell[64] reported it from the cattle yards at East Buffalo in 1883, where it was evidently introduced from the west.

Potentilla intermedia Linnaeus

Shore of Lake Champlain, near Port Henry (E. P. Killip, August 8, 1917). A rare species, sparingly introduced from Europe and also collected several years ago at Flushing, Long Island by George A. Hulst[65].

Geum aurantiacum Fries[66]

(Geum rivale x strictum *Rydberg*)[67]

Stems 6 to 8 dm high from a perennial root, smooth below, finely pubescent in the inflorescence and on the upper part of the stem. Basal leaves 1 to 5 dm long, the smaller ones with somewhat rounded, blunt leaflets, 3 to 5 in number, cuneate at the base; petioles somewhat ciliate at the base; leaflets of the larger leaves lanceolate in the lower pair to oblanceolate or obovate and acute in the pairs below the orbicular or orbicular-obovate terminal leaflet, glabrous above and below, paler beneath; sepals purplish, broadly ovate-lanceolate, acuminate, 1 to 1.5 cm long, becoming reflexed; petals 1.5 to 2 cm long, clawed at the base, the apex emarginate, yellowish or purplish yellow.

Adirondack mountains (C. H. Peck, June). No information is given on the label by Doctor Peck as to the exact locality, but the plant was doubtless collected in the vicinity of North Elba.

Agrimonia bicknellii (Kearney) Rydberg[68]

Related to Agrimonia parviflora, from which it is marked chiefly by its tuberous thickened roots, fewer leaflets, velvety pubescence and absence of glandular-granulules on the leaves of the stem.

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[63] Torrey Bot. Club Bul. 21, p. 31. 1894.

[64] Buffalo Nat. Field Club Bul. 1, p. 86. 1883.

[65] A. J. Grout in Torreya, 2: 51. 1902.

[66] Schentz. Nova Acta Soc. Upsal. III. 7, pt 6, p. 30. 1870.

[67] North American Flora 22: pt 5, p. 407. 1913.

[68] Torrey Bot. Club Bul. 38, p. 450. 1911. North American Flora 22, pt 5, p. 394. 1913.

Vaughns, Washington county (C. H. Peck, August 7). Tappantown, Rockland county (C. F. Austin).

Astragalus carolinianus Linnaeus

Sandy fields near Long pond, Monroe county (H. D. House, July 3, 1917). Not a rare plant in western New York although Paine[2] (p. 72) records it only from the east side of Onondaga lake and from Seneca lake. The Beck herbarium contains a specimen from Rochester and also one labeled "Albany, G. W. Clinton." The latter locality might be questioned were it not for the fact that the same species is reported from the banks of the Hudson by Wright and Hall[69]. It has not been collected in eastern New York within recent years and was not observed by Doctor Peck.

Lespedeza brittonii Bicknell

Edge of woods, Glenmont, Albany county (H. D. House, September 12, 1917). Stems widely spreading and somewhat ascending, resembling Meibomia michauxii in general habit. The type collected at Bronxville, New York City, seems to be the only other published record of the occurrence of this species in New York State (Torreya, 1: 103. 1901).

Polygala paucifolia forma alba (Eights)

P. paucifolia var. alba Eights; T. & G. Fl. N. A. 1: 132. 1838; Torr. Fl. N. Y. 1:152. 1843.

P. paucifolia var. albiflora Knight, Rhodora 8:66. 1906.

Stony woods near Glenmont, Albany county (H. D. House, June 2, 1917). The occurrence of this pure white-flowered form of the fringed milkwort in large patches suggests that the underground rhizomes afford the chief means of reproduction in this plant. Paine[2] (p. 71) reports this form from Schenectady (Pearson) and Otsego county (Mrs J. Shaw). It has also been found at Pond lake, Broome county by C. F. Millspaugh[70], and near Binghamton by H. L. Griffis (state herbarium).

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[69] Wright & Hall. Catalogue of the Plants of Troy and Vicinity, p. 8. 1836.

[70] Torrey Bot. Club Bul. 12, p. 101. 1885.

Viola triloba Schweinitz

This violet has been in the past so frequently confused with Viola palmata, that the older published records afford little data of value regarding its distribution. Recent collections and the material in the state herbarium indicate that it is common in most parts of the State except the Adirondack region and the northern counties. The following collections are represented in the state herbarium: Rensselaer county: Lansingburg (C. H. Peck, June 5, 1905), Bald mountain (H. D. House, August 25, 1916). Albany county: Wemple (H. D. House, June 9, 1917). Monroe county: Mendon (H. D. House, July 5, 1917). Nassau county: Port Washington (H. D. House, May 20, 1916).

Viola septentrionalis Greene

A frequent violet in most parts of the State except the coastal plain and especially abundant in woodlands of the Adirondack region. Peck[71] reports it from Warrensburg, Warren county, and Minerva, Essex county. He has also collected it at North Elba and other places in the northern part of the State (state herbarium).

Recent collections of this species from other parts of the State are: Albany county: Kenwood (Rubinger, May 1916). Herkimer county: Cedar Lake (H. D. House, June 23, 1917). Madison county: Onedia (H. D. House, May 15, 1915). Oneida county: Taberg (H. D. House, June 7, 1916). Genesee county: Bergen swamp (H. D. House, June 2, 1916).

Viola labradorica Schrank

A small subalpine and subarctic violet with leaves one-quarter to three-quarters of an inch wide, linear stipules which are entire or nearly so and small bright-blue flowers. A species formerly confused with the common american dog violet (Viola muhlenbergia Torr).

Mossy hummocks in a cold sphagnum bog near the head of Fourth lake, Hamilton county (H. D. House, June 26, 1917). Minerva, Essex county (C. H. Peck, in state herbiarium). I would also refer to this species with little hesitation specimens collected at Randolph, Cattaraugus county, by William B. Limberger, May 1909 and distributed under the name of Viola cardaminafolia Greene. They are presumably cotypes of Greene's species which was collected by Mr Limberger at Randolph.

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[71] N. Y. State Mus. Bul. 94, p. 35. 1905.

Viola adunca J. E. Smith

A rather local violet confined chiefly to sandy and stony sterile soil, or sometimes on ledges of shale rock. All our specimens are from the northern and western parts of the State. It has been referred to the European Viola arenaria DeCandolle, also reported as Viola canina var. puberla S. Watson, and Viola subvestita Greene.

Glenmont, Albany county (H. D. House, May 18, 1917). Luzerne, Warren county (H. D. House, July 20, 1917). Sylvan Beach, Oneida county (H. D. House[72] and also July 21, 1914). North Elba, Essex county (C. H. Peck). Warrensburg, Warren county (C. H. Peck). Gloversville, Fulton county (A. Olsson, June 15, 1912).

Frasera carolinensis Walter

(Figure 2)

Shaker woods near Sonyea, Livingston county (E. P. Killip, June 1, 1917). This is a rare and local species throughout the western counties of the State. Paine[2] (p. 116) reports it from the banks of the Genesee river (Hadley), East Bloomfield, Ontario county (Sartwell), Monroe county (L. Holzer and C. M. Booth) and south of Moscow, Livingston county (Bradley). There is a duplicate of the Bradley collection in the state herbarium. The reference in Torrey's Flora of New York[25] (2: 109) to the occurrence of this species along the West Canada creek in Herkimer county is quite obviously a mistake, as pointed out by Paine. George W. Clinton[49] (p. 78–79) cites observations by David Thomas and also by himself and D. F. Day which indicate that this species is a triennial plant.

Veronica teucrium Linnaeus

Well established along roadsides near Mexico, Oswego county (H. D. House and E. P. Killip, July 1, 1917). Not previously reported from New York.

Agalinis acuta Pennell[73]

Moist depressions of the Hempstead plains, Long Island (H. D. House, September 8, 1915). This is Agalinis parvifolia (Chapman) Small, in Britton & Brown's Illustrated Flora, 3: 212, 1913, as to the northern extension of range there credited to the species. It also occurs on Martha's Vineyard (M. L. Fernald, September 12, 1901. Plantae exsiccatae Grayanae, no. 45).

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[72] Torreya, 3: 166. 1903.

[73] Torrey Bot. Club Bul. 42, p. 338. 1915.

Agalinis maritima Rafinesque

A common species in the salt marshes of the Atlantic coast and rarely in bogs of the Ontario lowlands, in this respect exhibiting an extension of range comparable to that of Myrica carolinensis, Blephariglottis ciliaris and other plants. It has been collected at Mud lake near Hannibal, Oswego county (C. S. Sheldon, August 26, 1879, state herbarium) and at some locality along Lake Ontario near Rochester (Rev. L. Holzer, in state herbarium).

Utricularia intermedia Hayne

Mud lake near Hannibal, Oswego county (H. D. House, July 2, 1917). Pecksport, Madison county (H. D. House, June 9, 1916, subject of the color photograph in Wild Flowers of New York).

A rare species of bladderwort, but easily distinguished by the flattened character of its leaves. Paine[2] (p. 106) reports it from Hidden lake, southern Herkimer county, and Gray[54] reports it from near Watertown, collected by Crawe. B. D. Gilbert[74] records it from Beaver lake, Lewis county and the state herbarium contains specimens from Long Island (Miller), Sandlake, Rensselaer county (Peck) and "The Plains," Adirondack mountains (Peck).

Knautia arvensis (Linnaeus) T. Coulter

A native of Europe which has become sparingly naturalized in this state. Roadsides near Jordanville, southern Herkimer county (H. D. House, June 24, 1917). Roadsides near Richfield Springs (H. N. White, July 7, 1910, in state herbarium). It has also been reported from Staten Island by Hollick and Britton[75].

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[74] Torrey Bot. Club Bul. 6, p. 362. 1879.
[75] Torrey Bot. Club Bul. 13, p. 83. 1886.

TWO PLANTS NEW TO THE FLORA OF THE UNITED STATES

Among a number of flowering plants received from Dr W. Haydon of Oregon, were two species new to the flora of the United States, regarding which there should be made a definite record.

Geryonia Schrank, ex Hoppe in Flora 1: 229. 1818

Bergenia Moench, Meth. 664. 1794. Not Bergenia Neck. 1790.
Megasea Haw, Enum. Saxifr. 6. 1821.

Geryonia ciliata (Haw) comb. nov.

Saxifraga ligulata Wall. in As. Res., 8: 398. 1820. Not S. ligulata Murr. 1781.
Megasea ciliata Haw, Enum. Saxifr., 7. 1821.
Saxifraga ciliata Royle, Illustr. Bot. Himal., 226. pl. 49. fig. 2. Not Saxifraga ciliata Lindl. Bot. Reg. pl. 65. 1843, nor Walp. Rep. 2: 365.

A native of India of recent introduction on the Pacific coast. Found on dredgings at Ferndale, Coos bay, Oregon by Dr W. Haydon, no. 527. April 15, 1915. (Specimens deposited in Gray Herbarium).

Geranium pyrenaicum Burm. f.

Mussel reef, Cape Arago, Coos county, Oregon. Dr W. Haydon, no. 378. April 17, 1914. Native of Europe.

NEW OR INTERESTING SPECIES OF FUNGI V

Aleuria rhenana Fuckel

(Symb. Myc. 325. 1869)

An interesting cup fungus not previously reported from New York. On ground in coniferous woods, Pittsford, Monroe county. F. S. Boughton, September 30, 1912. Determined by Dr F. J. Seaver. Doctor Seaver describes and illustrates this species in Mycologia, 6: 275, pl. CXLII, November 1914, and it is also pictured by Cooke (Mycographia, pl. 112, fig. 400) under the name Peziza splendens Quel.

Armillaria ventricosa Peck

(Figure 3)

Originally described by Peck as Lentinus ventricosa, but later transferred by him and redescribed as a species of Armillaria from specimens received from Dr L. M. Underwood, collected in Alabama. It was collected in Nova Scotia in 1909 by A. H. Mackay, and recently at Asheville, North Carolina, by Prof. H. C. Beardslee, so that its known range now extends from Nova Scotia to Alabama, but has not been reported from New York. The type of Lentinus ventricosa was collected at Tacoma Park, D. C., by T. A. Williams, November 1896.

I am indebted to Prof. H. C. Beardslee for the excellent photograph of fresh specimens which is reproduced here in order to illustrate one of the rarest of American Agarics and one which should be looked for in New York.

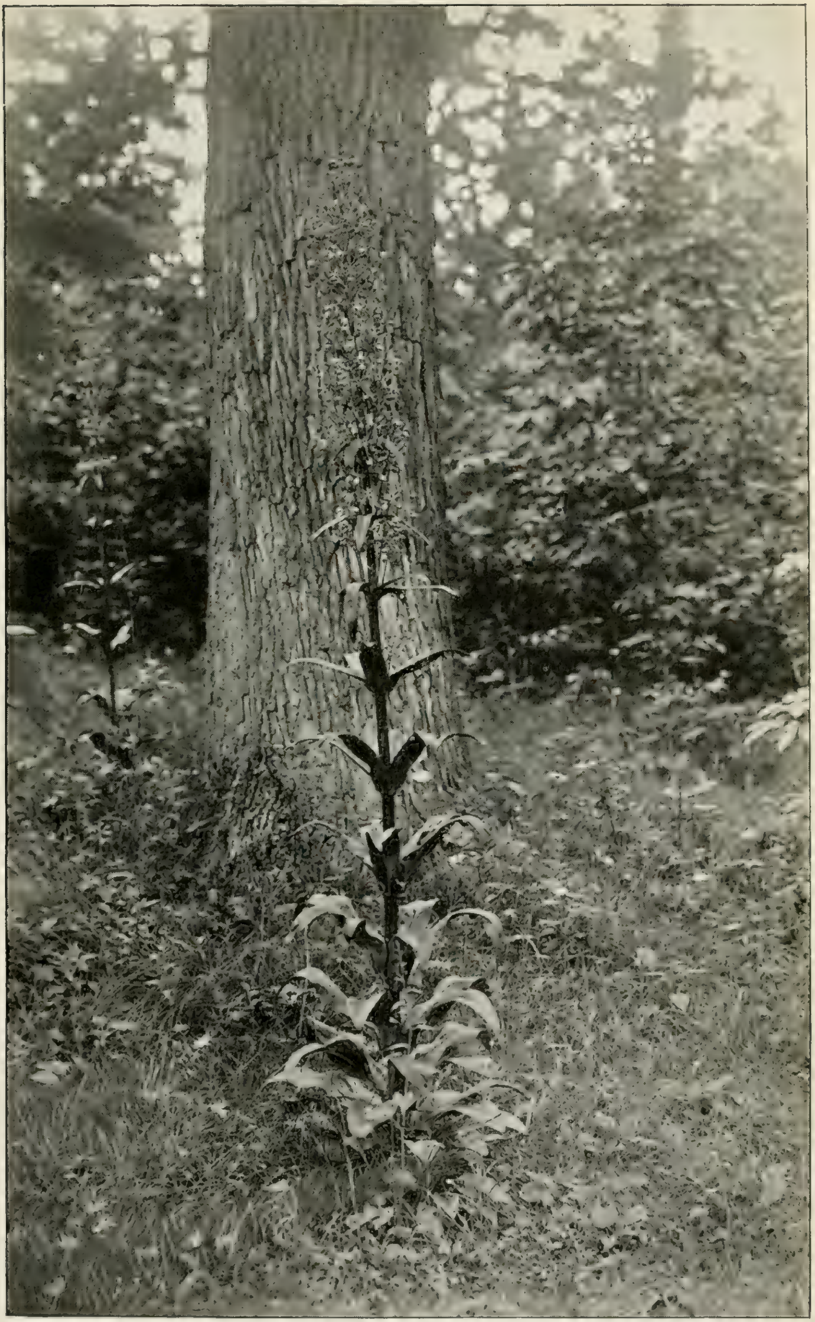
Bombardia bombarda (Batsch)

Sphaeria bombarda Batsch, Elench. Cont. I. fig. 181. 1786.
Bombardia fasciculata Fr. Summ. Veg. Scand. 389. 1849.
Bertia bombarda Ces. & DeNot. Schema Sf. It. in Comm. 1: 225.

On decorticated wood of Fagus, northern Herkimer county. H. D. House, July 1917. On decorticated wood of Fagus. Croghan and Worcester, C. H. Peck. On decayed wood, Portville and Helderberg mountains, C. H. Peck.

Catinula turgida Desm.

On dead limbs of Corylus rostrata. West Fort Ann, Washington county. S. H. Burnham, no. 119. June 4, 1916 (Det. Dearness).



(Photograph by G. A. Bailey)

Fig. 2 Frasera carolinensis Walter

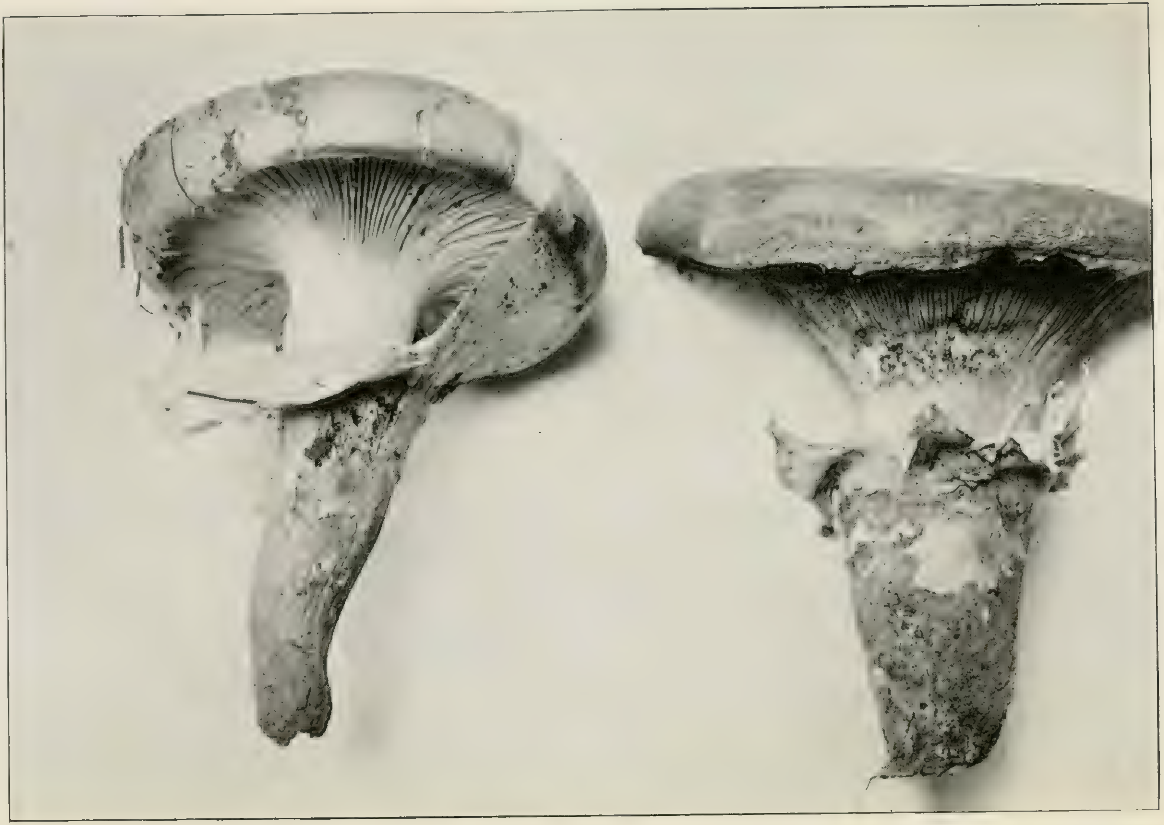


Fig. 3 Armillaria ventricosa Peck

Coniophora vaga Burt

On old log of Ulmus americana. Vaughns, Washington county. S. H. Burnham, no. 20. September 1, 1915.

Dicaeoma seymouriana Arthur

(Puccinia seymouriana *Arthur*)

Telia stage on leaves of Spartinia michauxiana Hitchc. South Bay, Madison county, on shore of Oneida lake. H. D. House. August 17, 1917. The sori appear upon the rough or under side of the leaves and between the veins, and hence is quite different from Puccinia fraxinata (Schw.) Arthur, which occurs upon the same host. The aecial stage of D. seymouriana occurs at the same locality upon leaves of Cephalanthus occidentalis L. and appears early in summer. Both of the host plants are very common and often grow together along the shores of Oneida lake and it is probable that the rust will be found at other places around the lake.

Didymaria didyma (Ung.)

Ramularia didyma Ung. Exanth. 169 pl. 2, fig. 10, 1833. Didymaria ungeri Corda, Anl. pl. B. fig. 9. 1842.

On leaves of Ranunculus septentrionalis. Redfield. Dr C. H. Peck, July 1890.

Eutypa eutypa (Achar.)

Lichen eutypus Achar. Lichen. Svecicae Prodr. 14. 1798. Sphaeria decomponens Sow. 1799. Sphaeria eutypa Fr. 1822. Valsa eutypa Nits. Eutypa acharii Tul.

On decorticated wood of Populus. Helderberg mountains. Dr C. H. Peck. On decorticated wood of Ostrya. Griffins, Dr C. H. Peck. On decorticated wood of Quercus rubra, South Ballston, Dr C. H. Peck.

Corticium alutaceum (Schrad.) Bres.

On fallen bark and wood, McKown's grove, Albany, N. Y. H. D. House and Joseph Rubinger, October 23, 1915.

Corticium arachnoideum Berk.

On fallen bark (Quercus) and leaves, Karner, Albany county. H. D. House, November 2, 1917.

Corticium atrovirens Berk.

On fallen trunk of Pinus rigida. Karner, Albany county. H. D. House, October 28, 1916 and October 8, 1914.

Corticium centrifugum Lev.

On fallen limbs of Acer rubrum. Karner. H. D. House, October 28, 1916.

Corticium confluens Fr.

On fallen limbs of Acer rubrum. Karner. H. D. House, October 26, 1916. On fallen limbs of Populus tremuloides, Karner, H. D. House, October 20, 1917.

Corticium epigaeum E. & E.

On decayed wood of Acer. Karner, Albany county. H. D. House, no. 14,160. October 3, 1914.

Corticium scutellare B. & C.

On dead bark of Carpinus, Meadowdale, Albany county. C. H. Peck, June 30, 1910. On Alnus, Karner, C. H. Peck (no. T.22). On Acer rubrum, Karner, C. H. Peck, October (no. T.7). On fallen limbs of Populus grandidentata, Karner. H. D. House, October 26, 1916.

Corticium stramineum Bres.

On fallen limbs of Acer rubrum. Karner. H. D. House, October 28, 1916.

Corticium vagum B. & C.

On hemlock log, Tsuga canadensis, North Elba, Essex county. C. H. Peck, July 28, 1905. On decayed log of Tsuga canadensis, McKown's grove, near Albany, H. D. House and Joseph Rubinger, October 23, 1915. On fallen trunk of Pinus strobus, Karner, Albany county. H. D. House, October 26, 1916. On decayed log of Betula, Karner, H. D. House, October 18 & 20, 1917.

Hypochnus rubiginosus Bresadola

(Zygodesmus rubiginosus *Peck*)

At the base of old stems of Solidago, in a moist field near Albany. H. D. House, December 3, 1916.

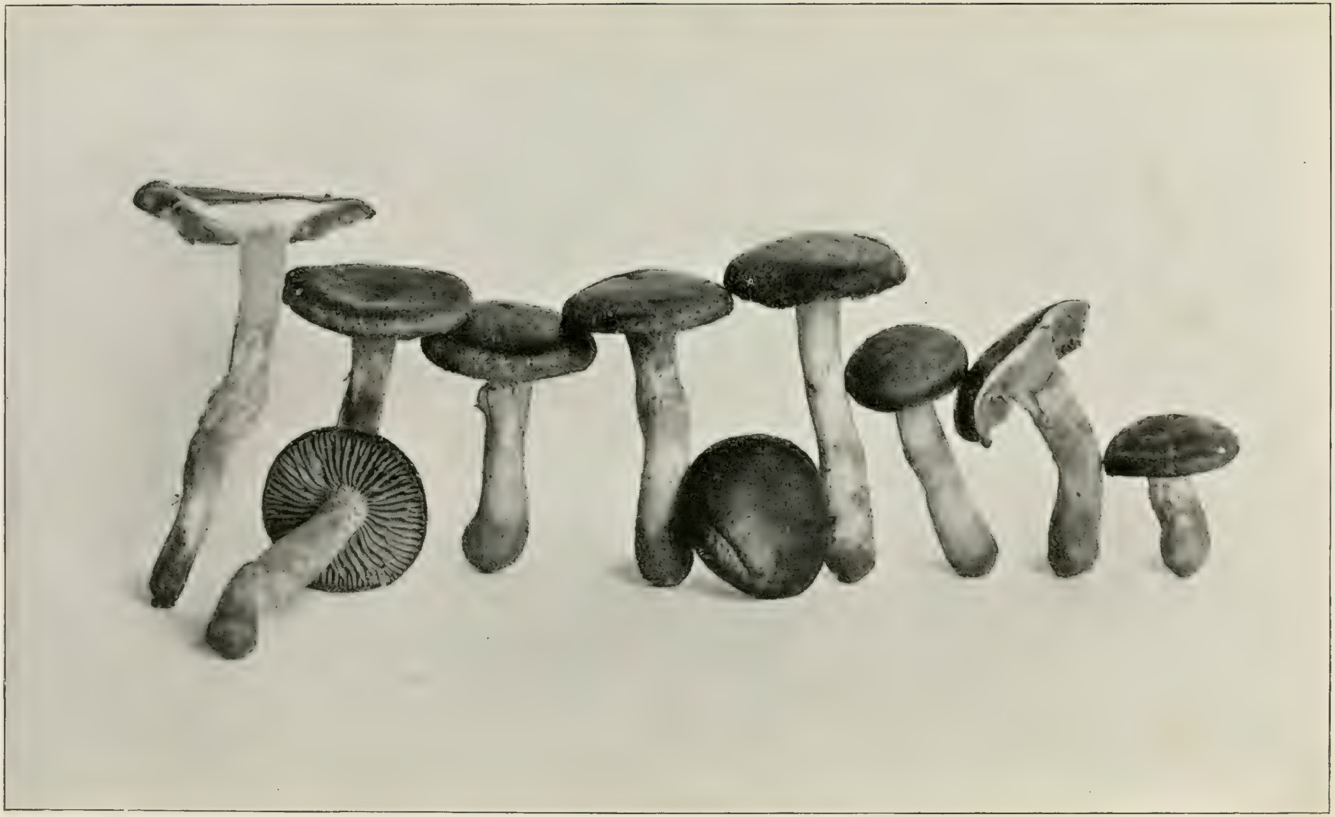


Fig. 4 Hebeloma colvini Peck

Gnomoniella gnomon (Tode)

Sphaeria gnomon Tode, Fungi Meckl., 2: 50, fig. 125. 1790.
Gnomonia vulgaris Ces. & DeNot. Schem. Sfer, 57.
Cryptosphaeria gnomon Grev.
Gnomoniella vulgaris Sacc. Syll. 1: 416. 1882.

· On fallen leaves of Corylus and Ostrya, West Troy. C. H. Peck.

Gymnopilus carbonarius (Fr.) Murrill

(Flammula carbonaria *Quel.*)

Growing on charred pine stumps, McKown's grove near Albany. H. D. House, October 28, 1917.

Hebeloma colvini Peck

(Figure 4)

In barren sandy wastes near Karner, Albany county. H. D. House, October 8, 1917 and H. D. House and G. F. Atkinson, November 1, 1917.

Plants gregarious or scattered, pileus only above the surface of the sand, 2 to 7 cm high; pileus 2 to 5 cm broad; stems stout, 4 to 7 mm thick, even, rounded at the base, solid or stuffed to hollow above, pruinose at the apex. Pileus convex-expanded, viscid when moist, smooth, walnut-brown when moist, sometimes paler to alutaceous, sometimes with a distinct lighter zone on the margin, rarely the darker zone on the margin, odor and taste not distinctive; flesh whitish under the brown color which is next the cuticle, the thin margin incurved, slightly exceeding the lamellae; structure homogeneous, floccose, but cuticle more or less gelatinous and brown-colored beneath. Lamellae adnexed, sinuate, not crowded, subventricose, pallid to vinaceous-drab and tinged with ochraceous when covered with spores, edge whitish, cystidia none on the sides of the lamellae, edge of the lamellae with sterile, flexuose, cylindrical or subclavate cells 40 to 50 x 6 to 8 μ; basidia 4-spored; spores long ovate to subellipsoid, inequilateral, smooth, pale yellowish, in mass ochraceous-tawny, granular, 12 to 16 x 7 to 10 μ.

The species appears to have been named in honor of Mr Verplanck Colvin, at one time director of the Adirondack land survey. The spot where the above described specimens were collected is perhaps the type locality as no similar spot with such an abundance of the species was found elsewhere near Karner.

Hebeloma parvifructum Peck

(Figure 5)

In Pine woods, McKown's grove, near Albany. H. D. House and G. F. Atkinson, October 28, 1917.

Plants gregarious, 4 to 6 cm high; pileus 3 to 5 cm broad, viscid, convex-expanded, sometimes umbonate, at first white, then pale clay color to buff clay and darker or tawny on the umbo, or some plants tawny over the entire pileus (apparently such plants had been frozen or were very old); stems 4 to 6 mm thick, stout, even, white but tawny at the base, in age tawny to chestnut, solid or stuffed, fibrillose, pruinose at the apex, sometimes with a very delicate ring of threads near the top colored by the spores. Lamellae at first white, becoming buff to clay colored, adnate, emarginate, broad, cystidia numerous on the sides and edges of the gills, sublanceolate to subfusoid, the center gradually narrowing into the more slender terminal portion with a slender pedicel, 45 to 75 x 10 to 15 μ; basidia 4-spored; spores subelliptical to oboval and inequilateral in profile view, smooth, 5 to 7 x 3 to 4 μ.

Helicosporium mulleri (Corda) Sacc.

On dead bark of Populus grandidentata. Karner, Albany county. H. D. House, October 28, 1916. Also collected by Doctor Peck on dead bark at North Greenbush.

Hygrophorus hypothejus Fr.

(Figure 6)

Plants gregarious, 5 to 8 cm high; pileus 3 to 6 cm broad; stems 5 to 8 cm long and stout; pileus convex-expanded and in age depressed, viscid to glutinous when moist, dark umber to bister when young, paler to wood-brown in age or umber in the center and with a faint tinge of yellow or tawny toward the margin, not striate; lamellae somewhat decurrent, yellow or white becoming yellow; stem concolorous with pileus but paler, usually narrowed toward the base, universal veil slimy, extending from stem to margin of the pileus when young, apex of stem not viscid, nearly smooth, minutely floccose pruinose.

On sandy ground in edge of thicket of pine trees, Karner, Albany county. H. D. House and G. F. Atkinson, November 1, 1917.

Hymenochaete cinnamonea (Pers.) Burt

(H. spreta *Peck*)

On dead limbs of Alnus rugosa. Karner, Albany county. H. D. House, October 3, 1914 and November 2, 1916.

Hymenochaete corrugata (Fr.) Lev.

North of Rensselaer, on dead branches of Acer saccharum and Vitis aestivalis. H. D. House, April 27, 1916. A common species collected by Doctor Peck in the Catskill mountains, Altamont, Elm lake and North Elba.

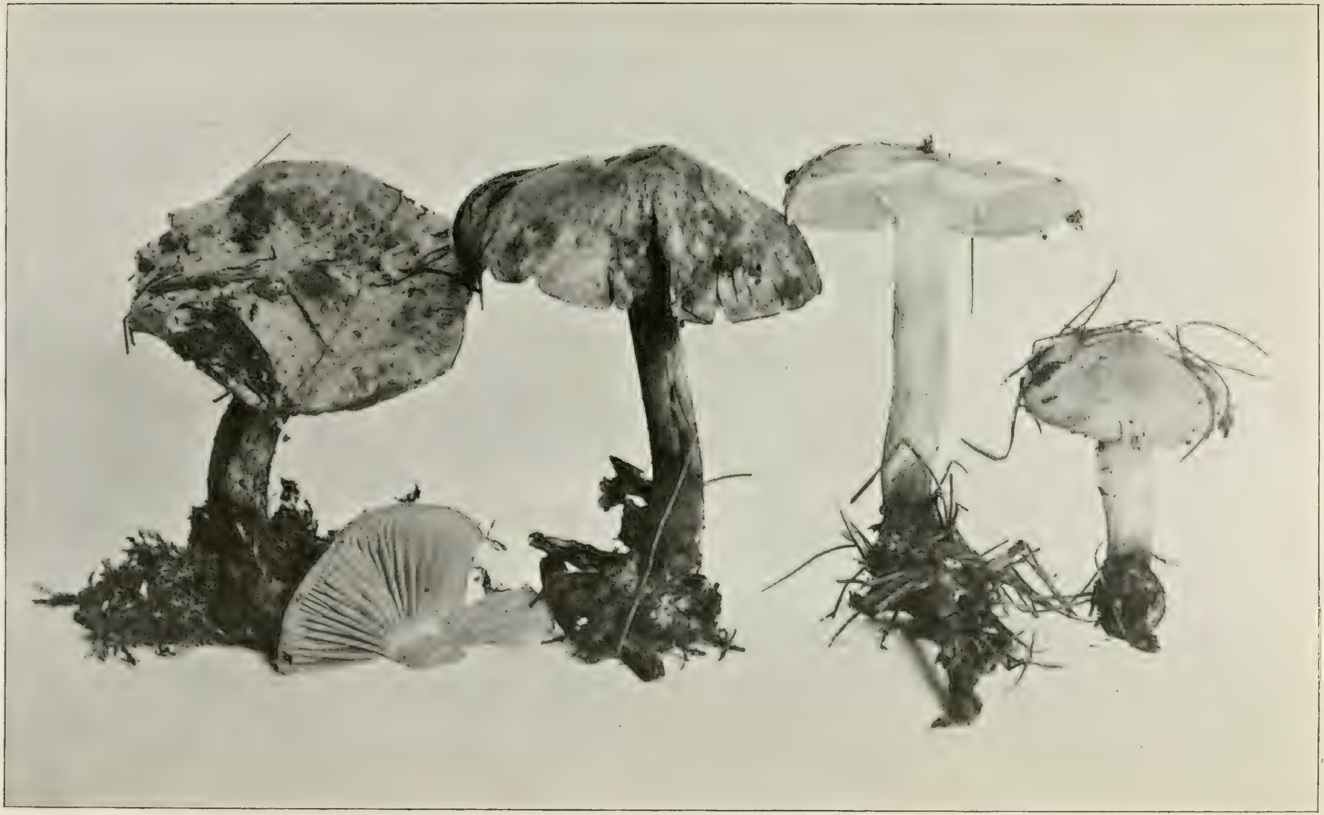


Fig. 5 Hebeloma parvifructum Peck

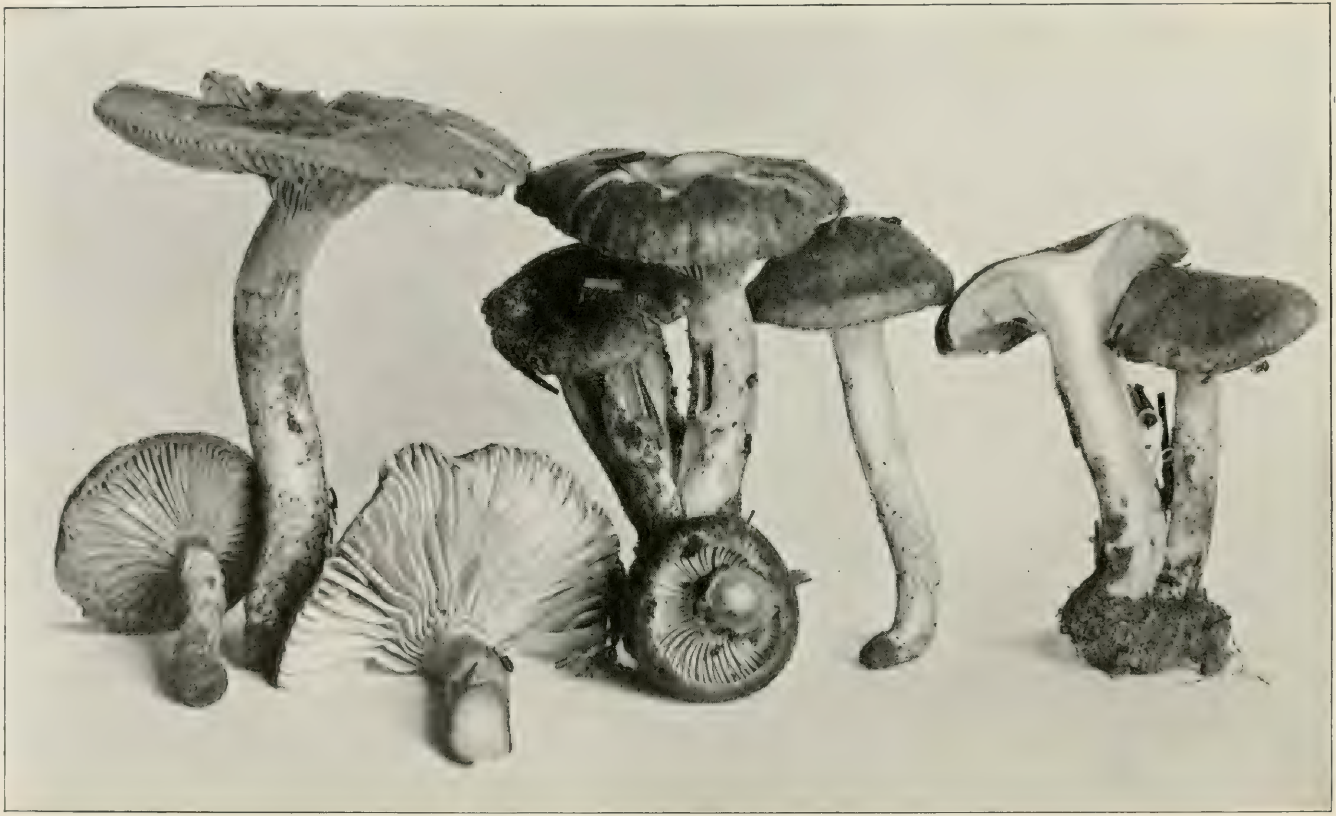


Fig. 6 Hygrophorus hypothejus Fries

Hymenochaete rubiginosa (Schrad.) Lev.

On fallen rails and limbs of Castanea dentata. H. D. House, November 2, 1916. Also collected at Orient Point, Long Island, by Roy Latham in 1911 and at Port Jefferson, Long Island by Doctor Peck, several years ago.

Laccaria trullisata (Ellis) Peck

In sand near Karner, Albany county, growing with Hebeloma colvini Peck. H. D. House, October 14, 1917.

Melampsoropsis ledicola (Peck) Arthur

Upon the occasion of a visit to "Agate bog" near Cohasset on Fourth lake, northern Herkimer county on June 27, 1917, there was observed a great abundance of this rust upon the leaves of Ledum groenlandicum. W. P. Fraser (Mycologia, 3:70. 1911; 4:177. 1912) has connected by means of cultural experiments, this rust with Peridermium decolorans Peck. Accordingly another visit was made to this bog on August 8th, and a corresponding abundance of the Peridermium upon Picea mariana was observed. The absence of any species of Peridermium upon Abies or Tsuga in the immediate vicinity of this bog seems to corroborate Fraser's results.

The rust upon Ledum has been collected by Doctor Peck in Bergen swamp, Genesee county; Lake Pleasant, Hamilton county; Sandlake, Rensselaer county, and on Mount Marcy, Essex county. The Peridermium upon Picea mariana has been collected by Doctor Peck at Sandlake, Mount Colvin, North Elba and Elizabethtown, and by H. D. House at Featherstone lake, Schenectady county.

Macrophoma ulmicola Dearness

On dead branches of Ulmus americana L. Vaughns, Washington county. S. H. Burnham, no. 126. March 29, 1916.

Melogramma melogramma (Bull.)

Variolaria melogramma Bull. Champ. 1:182. pl. 492. f. 1. 1790. Sphaeria ocellata Pers. 1797. Sphaeria melogramma Pers. 1801. Melogramma bulliardii Tul. 1863. Melogramma vagans DeNot. 1857. Diatrype lateritia Ellis, 1882.

On bark of dead limbs of Betula lutea, LaSalle, Niagara county, G. W. Clinton. Meadowdale, Albany county, Dr C. H. Peck. Alcove, Albany county, C. L. Shear, no. 176.

Humaria peckii House, sp. nov.

Apothecia at first closed, finally opening and becoming shallow, cup-shaped to scutellate, externally pallid, subpruinose, surrounded at the base with a mass of white mycelium, reaching a diameter of 4 mm; hymenium slightly concave, pale-yellow or subochraceous; asci cylindric or subcylindric, reaching a length of 160 μ and a diameter of 12 μ, attenuated below into a rather long stemlike base; spores ellipsoid or ovoid, 1-seriate, each containing one oil-drop, about 8 x 12 μ; paraphyses not exceeding 2 μ in diameter, scarcely thickened above.

On damp decaying hay accompanied by a Sclerotium. Type collected at Menands, Albany county, N. Y., April 1890, by Dr C. H. Peck.

Midotis irregularis (Schw.) Sacc.

On decayed log of Acer. North Elba, Essex county. C. H. Peck, September 11, 1905. (Determined by Dr F. J. Seaver.)

Mycosyrinx osmundae Peck

Transforming portions of the fronds of Osmunda regalis, into characteristic brown "smutlike" masses. Common at Mud pond near Zurich, Wayne county. H. D. House, July 2, 1917. This has also been collected by Doctor Peck at Knox, by S. H. Burnham at Cambridge, and C. G. Pringle (no. 1541) in Vermont.

Nolanea peckii House, nom. nov.

Agaricus conicus Peck, Ann. Rep't N. Y. State Mus. 24:66. 1872. Not Ag. conicus Scop. 1772.

Nolanea conica Peck; Sacc. Syll. 5:723. 1887.

Among moss and on rotten wood in swamp. Sandlake, C. H. Peck, August 1870. Newfoundland, Waghorne no. 287.

Odontia trachytricha (E. & E.) Burt

(Peniophora trachytricha *E. & E.*, Odontia acerina *Peck*).

Karner, Albany county, H. D. House (no 14.207), October 8, 1914. (Det. Burt).

Peniophora cinerescens (Schw.) Sacc.

Syracuse, L. M. underwood no. 34, 1886 (det. by Burt).

Peniophora glebulosa Bresadola

On dead branches of Salix, Sandlake, C. H. Peck (no. T. 15, as det. by Burt).

Peniophora greschickii Bresadola

On dead limbs of Thuya occidentalis, North River, Warren county, C. H. Peck, September 27, 1911 (det. by Burt).

Peniophora incarnata (Fries) Massee

Star Lake, on dead branches of Fagus, C. H. Peck, August 12, 1907. On dead limbs of Prunus pennsylvanica, Albany, H. D. House, November 26, 1915 (det. by Burt).

Peniophora longispora Pat.

On decayed wood, East Berne, Albany county, C. H. Peck (det. by Burt).

Peniophora sulphurina (Karst.) v. Hohn & Litsch.

On decayed wood of Picea, Rainbow, Franklin county, C. H. Peck (det. by Burt).

Phlyctaena phlyctaenoides (B. & C.)

Septoria phlyctaenoides B. & C. N. Am. Fungi No. 441.
Phlyctaena septorioides Sacc. Syll. 3:594. 1884.

On dead stems of Phytolacca americana. Knowersville, Albany and Altamont, Albany county (C. H. Peck). Jamesville, Onondaga county (L. M. Underwood).

Phyllosticta arnicae Fckl.

On leaves of Arnica cordifolia. Evardo, Montana. M. E. Jones, no. 10625, July 13, 1909. Spores colorless, 5 x 1 μ.

Pilosace peckii House, nom. nov.

Agaricus (Pilosace) eximius Peck, 24th Ann. Rep't N. Y. State Mus., p. 70. 1872. Not Agaricus eximius C. P. Laest. Lapp. Torn. 45. 1860.

Pilosace eximia Peck; Sacc. Syll. 5: 1012. 1887. Peck, N. Y. State Mus. Bull. 75, p. 25. 1904.

A rare species, collected by Doctor Peck at Grieg, Lewis county, in August 1870.

Pseudoplectania nigrella (Pers.) Fckl.

On ground in pine woods, Sandlake, Rensselaer county, C. H. Peck, April. (Det. by Dr F. J. Seaver.)

Psilocybe cavipes House, nom. nov.

Agaricus (Psilocybe) unicolor Peck, 53d Ann. Rep't N. Y. State Mus., p. 845. 1901. Not Agaricus unicolor Bull. Herb. Fr. pl. 530, f. 2. 1791: Fl. Dan. t. 1071. f. 1; Fries, Hym. Eur. 225. 1874.

Psilocybe unicolor Peck; Sacc. Syll. 17: 89. 1905. Peck, N. Y. State Mus. Bul. 157, p. 102. 1912.

A rare species, collected by Doctor Peck on prostrate decayed mossy trunks of trees in woods near Savannah, Wayne county, in 1899.

Septoria cryptotaeniae Ell. & Rau

On living and languishing leaves of Deringia canadensis. Albany, H. D. House, July 24, 1916.

Spatularia velutipes C. & F.

In mossy woods near Cohasset on Fourth lake, northern Herkimer county, H. D. House, August 8, 1917.

Sphaerella clintoniana House, nom. nov.

Sphaerella rhododendrii Cooke, Jour. Bot. 108. 1883. Not S. rhododendri DeNot. Sf. Ital. 86. pl. 96.

On fallen leaves of Rhododendron maximum. Buffalo. G. W. Clinton.

Sphaerella tsugae House, nom. nov.

Sphaerella conigena Peck, 38th Rep't N. Y. State Mus. 104. 1885. Not S. conigena Peck, Rep't N. Y. State Mus. 33: 34. 1880.

Sphaerella peckii Sacc. Syll. 9: 649. 1891. Not. S. peckii Speg. 1880.

On fallen cones of Tsuga canadensis. Helderberg mountains and Knowersville (C. H. Peck).

Stereum rameale Schw.

On dead branches of Prunus pennsylvanica. Albany. H. D. House, November 26, 1916.

Stereum rufum Fr.

(Epicr. 553. 1838.)

Thelephora rufo-marginata Pers. Myc. Eur. 1: 124. 1822.

Thelephora rufa Fr. El. 127. 1828.

Tubercularia pezizoidea Schw. [E. Hitchc. Cat. Pl. Amherst 64. 1829, name only] Syn. Am. bor. 301. n. 3013. 1831.

Hypocrea richardsoni Berk. & Mont. Frost, Proc. Bost. Soc. Nat. Hist. 12: 80. 1869, name only Grevillea 4: 14. 1875.

Corticium pezizoideum Schrenk, Bull. Torrey Bot. Club 21: 385. 1894. Not C. pezizoideum E. & E. 1888.

This is a common species in New York, all collections seen being upon Populus tremuloides and Populus grandidentata. Saccardo refers "Thelephora rufo-marginata Pers." to this species, but Persoon gives as the habitat of it "ad ramos Tiliaceos," and unless "Auricularia cinerea Sowerby" (Fung. t. 388 f. 3) to which Persoon refers is unquestionably this species, Persoon's name can be referred to this species only with considerable doubt.

The species is represented in the state herbarium by the following collections: Karner (C. H. Peck); Alcove (C. L. Shear, no. 88, August 1892). Horicon (C. H. Peck, July 25, 1905). North Elba (C. H. Peck, October 15, 1901). Saranac Inn (P. L. Spaulding, May 31, 1909). Albany (H. D. House, May 3, 1914; October 22, 1916).

It was also collected in Colorado by Brandegee (no. 11, communicated by E. A. Rau), June 7, 1880.

Stereum versiforme B. & C.

On dead limbs of Populus tremuloides, Prunus virginiana, and Sassafras sassafras (H. D. House, October 28, and November 2, 1916). All resupinate. Det. by Burt.

Venturia dickiei (B. & Br.) Ces. & DeNot.

On living, languishing and dead leaves of Linnaea americana Forbes, in mossy woods near Cohasset on Fourth lake, northern Herkimer county. H. D. House, June 27, 1917. The only other collection of this rare species in New York was made many years ago by Doctor Peck on Mount Marcy.

Stereum ochraceoflavum Schw.

On dead twigs of Quercus ilicifolia, Albany, H. D. House, November 17, 1916 (det. by Burt).

Stereum erumpens Burt

On dead limbs of Sassafras sassafras, Karner, Albany county, H. D. House, April 22, 1915. New Scotland, Albany county, C. H. Peck (no. T.28), (det. by Burt).

Rhizopogon occidentalis Zeller & Dodge

(Ann. Missouri Bot. Gard. 5: 14. 1918)

Moscow, Idaho, L. F. Henderson, no. 5168 (type), in herbarium (N. Y. State Mus.). Pacific Grove, M. L. Sutliff. California, W. R. Dudley, no. 5325.

Messrs Zeller and Dodge in "Rhizopogon of North America" (Ann. Mo. Bot. Gard., 5:1–30, February 1918), report the following species from New York: R. luteolus Fries & Nordholm (Westport, C. H. Peck), R. roseolus (Corda) Zeller & Dodge and R. rubescens Tulasne.

NEW OR NOTEWORTHY SPECIES OF FUNGI

JOHN DEARNESS AND HOMER D. HOUSE

Anthostoma peckii Dearness & House, sp. nov.

Stromata scattered in the cortex, free from the wood and so coming off with the bark; covered by the thin cuticle which is ruptured by the minute black ostiola. Perithecia 4 to 12, loosely immersed in the slight stroma or merely valsoid, dark brown, 180 to 320 μ in diameter. Asci long cylindric, p. sp. 60 to 80 x 8 to 10 μ, paraphyses exceeding the asci. Sporidia brown, not opake, uniseriate, sometimes slightly overlapping, broadly elliptic or ovate, 8 to 10 x 7 to 9 μ.

On dead stems of Menispermum canadense L., North Greenbush. C. H. Peck, April. Type in the herbarium of the New York State Museum.

Anthostomella closterium (B. & C.) Sacc.

On dead stems of Opulaster opulifolius (L.) Kuntze, West Albany, N. Y. C. H. Peck, May. Sporidia in thin gelatinous envelopes, prolonged into a spur 30 to 50 μ long at each end.

Anthostomella picaceum (C. & E.) Sacc.

On decorticated and partially decayed wood of Acer. Catskill mountains. C. H. Peck. This material apparently does not differ in any marked degree from the typical form from New Jersey on Vaccinium.

Asterella fraxinina Dearness & House, sp. nov.

Perithecia subcuticular, developed upon an innate brown subicle of septate radiating fibers, 12 to 15 μ thick at the base, brown, depressed, about 150 μ in diameter. Ostiola short, about 20 μ wide. Asci obtuse, obclavate, widest at about one-third of their length from the base, 45 to 54 x 7 to 9 μ; paraphyses obscure. Sporidia hyaline, uniseptate, lower cell larger than the upper, some of them curved, 12 x 3 to 3.5 μ.

On old fallen petioles of Fraxinus nigra Marsh. Sandlake. C. H. Peck, May. Type in herbarium of the New York State Museum.

Aylographum onocleae Dearness & House, sp. nov.

Perithecia innate, appearing dull black through the epidermis, 1 to 2 mm or by confluence, 3 to 4 mm long by .25 to .35 mm wide, simple or seldom confluently branched; lip nearly closed, concealed by the epidermis, split longitudinally into fibers. Asci cylindric, straight or curved, 33 to 55 x 6 to 7.5 μ; paraphyses none or obscure. Sporidia biseriate, elliptic-oblong, inequilateral, uniseptate, 9 to 12 x 3 μ, not constricted.

On dead stems of Onoclea struthiopteris (L.) Hoffm. (Matteuccia struthiopteris (L.) Todaro), Shelburne, Vermont. C. G. Pringle, no. 1032. May 1880.

This is quite distinct from Aylographum filicinum Lib. which has ovate-oblong, sparse perithecia and ovate asci; but may prove to be the ascigerous stage of Leptostroma litigiosum or some closely related species.

Caliciopsis pinea Peck

A rare and interesting fungus described by Peck in 1880, and more recently collected by R. G. Pierce, November 1916, on shrunken areas of the cortex of living or recently dead branches of Pinus strobus, near Keene, Essex county. This seems to be the first record of its collection in New York since it was originally found by Doctor Peck. Also collected in Vermont by C. G. Pringle.

In Mr Pierce's collection the fungus is mixed with or grows upon Graphis scripta, a lichen, a condition not mentioned by Peck and its relationship to the lichen, if any, can not be determined without further examination of fresh material. The mature fungus has elongated black, slender, "ascomata," 2 mm high or higher, thickened at the base, the apex urceolate-capitate and easily broken off in dried specimens; asci ovoid, slender-stipitate; spores elliptical, 5 to 6 μ long.

In this connection it may be noted that the genus Hypsotheca E. & E. (1885), is in all essential features the same as Caliciopsis Peck.

Anthostoma cercidicolum (B. & C.) Sacc.

(Syll. 1: 306. 1882)

Diatrype cercidicola B. & C.; Peck, Rep't N. Y. State Mus. 25: 101. 1873. Cke. Grevillea 14: 16. 1885. E. & E. Pyren. 582. 1892.

Hypoxylon suborbiculare Peck, Rep't N. Y. State Mus. 30: 63. 1878. (Not Hypoxylon suborbiculare Welw. & Curr. 1867 = Nummularia suborbicularis Sacc. 1882)

Fuckelia cercidicola Cke. Grevillea 12: 52. 1883.

Nummularia lateritia E. & E. Proc. Phila. Acad. 144, 1893.

This interesting species was first described by Peck as "Diatrype cercidicola B. & C.," from specimens collected near Buffalo in 1871 by G. W. Clinton. The host was unknown, but is now recognized as Fraxinus nigra. The description is not by Berkeley and neither Berkeley nor Curtis had ever seen the Clinton specimens upon which Peck based his description. Peck says it was like a specimen received from Curtis under that name. That specimen can not now be found in the state herbarium and may have been returned to Curtis. The host of Peck's species was not Cercis, and the Curtis specimen, if in existence, may be at Kew, and was probably not satisfactory for diagnosis since the name was never published except as by Peck.

Peck later discovered better specimens and repudiated the earlier name by redescribing the fungus as Hypoxylon suborbiculare. He adds to the confusion, however, by stating that the host was Acer saccharum. Examination of the host shows it to be Fraxinus nigra. In 1890 Professor Dearness sent specimens of this to J. B. Ellis, which were identified as Nummularia rumpens Cooke, but in 1893 Ellis described it as Nummularia lateritia. The Dearness collections were distributed as — E. & E. North American Fungi no. 3033 and Fungi Columbiana no. 326.

Peck makes no mention of the name given to Clinton's earlier collection when he described Hypoxylon suborbiculare. That he regarded them as the same, at least later on, is shown by the fact that he changed the name on the label of the Clinton specimen to read "Hypoxylon suborbiculare Peck. Reported as Diatrype cercidicola B. & C."

The name "cercidicola" is most unfortunate, but apparently must stand. Peck's later name "suborbiculare" is invalidated by the earlier use of that name both in Hypoxylon and in Nummularia.

Specimens examined from New York are all upon Fraxinus nigra, viz: Buffalo (G. W. Clinton, type of Diatrype cercidicola B. & C.; Peck): Sandlake (C. H. Peck, type of

Hypoxylon suborbiculare Peck): Sanford's Corners, Vernoa, South Ballston and Mechanicville (C. H. Peck).

Camarosporium dichomeroides Brun.

On dead branches of Sambucus canadensis L. North Greenbush, C. H. Peck, June.

Ceratostoma avocetta (C. & E.) Sacc.

On much decayed wood of Fagus. North Elba, Essex county. C. H. Peck, August. Compared with C. avocetta collected at Sonntagsberg, Austria, by Strasser and determined by Rehm.

Cercospora depazeoides Sacc.

On living leaves of Sambucus canadensis Linn. Karner, Albany county. H. D. House, October 18, 1917.

Coccophacidium crustaceum (Curt.) Durand

On dead twigs and branches of Pinus strobus, between Elizabethtown and Keene, Essex county. R. G. Pierce, November 1916.

A rather common species and represented in the state herbarium by several collections under the name of Phacidium pini, which it resembles. Collected October 28, 1917, on the same host at Albany by H. D. House.

Coniosporium tumulosum Sacc.

On decorticated and weathered wood of Thuya occidentalis, Edmond's ponds, Adirondack mountains. C. H. Peck, July.

Coryneum triseptatum Peck

Originally described on fallen leaves of Rhododendron maximum from Forestburg, N. Y. A collection of Lophodermium sphaeroides (A. & S.) Duby, on leaves of Ledum groenlandicum (Sandlake, C. H. Peck, September) contains a single leaf of Ledum upon which is Coryneum triseptatum Peck, with characteristic 3-septate spores, 12 to 15 x 4 to 4.5 μ, on stalks 20 to 45 x 1.5 μ.

Cryptospora aculeans (Schw.) E. & E.

The type of Diaporthe inornata Peck on Rhus typhina, Cabin John bridge, Maryland (E. Bartholomew, no.

4326, June 15, 1910) shows no essential differences from Cryptospora aculeans. A collection on Rhus copallina (Sylvan Beach, N. Y., C. H. Peck, July) and determined by him as Diaporthe albovelata (B. & C.) Sacc. is also the same.

Cytospora sassafras E. & E.

On dead shoots of Sassafras sassafras, Karner, Albany county, N. Y. H. D. House, November 2, 1916. Albany, H. D. House, no. 14.2, August 30, 1913 (duplicate of material upon which Cytospora phomopsis Saccardo is based).

The descriptions of C. phomopsis and C. sassafras are nearly alike. Saccardo says "4 to 5 loculigeris," Ellis and Everhart say "multilocularibus." The smallest number counted in the Karner material was eight. Saccardo says "intus griseus" while Ellis and Everhart do not mention the interior color.

The description of Sphaeria albofarcta Schw. (Cytospora albofarcta Starb.) places so much emphasis upon the white interior that it may not be the same as C. sassafras E. & E.

Dendrophoma variabilis Dearness & House, sp. nov.

Pycnidia 90 to 350 μ in diameter, seated in the xylem, sometimes piercing the cuticle but generally decorticating it, black, shining, subcoriaceous, globose-conic with short ostiolum to lenticular with elongated or cylindric ostiolum up to .3 mm long. Walls consisting of a single layer of fairly regular, dark-brown polygonal cells, about 15 μ in diameter, which are covered within by a stratum of hyaline branched conidiophores, 25 to 250 x 1 to 1.5 μ, seated upon a dilutely colored prosenchymatous, mycelial layer and bearing oblong, hyaline conidia 4.5 to 6 x 1 μ.

On dead stems of Eupatorium maculatum L. North Greenbush. C. H. Peck, May.

Dermatea acerina (Peck) Rehm

Griffins, N. Y., on Acer saccharum. C. H. Peck (as Tympanis aceris Peck). Caroga. C. H. Peck (as Scleroderris acerina (Peck) Sacc.). Sandlake, on Acer rubrum. C. H. Peck, July. North Elba, on Acer saccharum. C. H. Peck. Old Forge on Acer saccharum. C. H. Peck, August, 1892. Sandlake on Acer saccharum. C. H. Peck, July, no. 6 S (duplicate of this was described by Saccardo as Phaeangium peckianum, and the specimen retained in the state herbarium is not distinct from Dermatea acerina (Peck) Rehm. It has also been collected at Middlebury, Vt. (E. A. Burt, June 25, 1896, in N. Y. State herbarium).

Diaporthe artospora Dearness & House, sp. nov.

Perithecia thickly and evenly scattered in the unaltered cortex, not reaching to or blackening the xylem, black, 200 μ in diameter. Ostiola long conic, 50 μ thick at base. Asci fusoid, 18 to 24 x 6 to 9 μ. Sporidia hyaline, oblong, uniseptate, 7 to 9 x 1 to 1.5 μ.

On fallen petioles of Fraxinus nigra. Sandlake, N. Y. C. H. Peck, May (year not indicated).

Diaporthe racemula (C. & P.) Sacc.

There are two collections of this in the state herbarium, viz, "Aiden Lair, Essex county. C. H. Peck, July 1873" and "Lower Ausable. C. H. Peck, July 1875." Both are on Epilobium angustifolium (dead stems). The latter is the better collection and perhaps the type of Sphaeria (Caulicolae) racemula C. & P. (29th Rep't N. Y. State Mus., p. 65. 1878). It does not appear to be different from Diaporthe epilobii Cooke. The description by Peck is incomplete and should state that the asci and sporidia are very variable; asci 18 to 45 x 4 to 8 μ; sporidia 9 to 12 x 2.5 to 3.5 μ.

Diaporthe spiculosa (A. & S.) Nitsch.

On dead branches of Fraxinus americana. Catskill mountains. C. H. Peck (Reported as Valsa crataegi in 31st Rep't N. Y. State Museum, p. 50). On dead branches of Fraxinus nigra. Verona, N. Y. C. H. Peck, August 1879.

Diatrypella aspera (Fr.) Nits.

This species is reported by Peck (28th Rep't N. Y. State Mus., p. 71. 1876) from Tyre, N. Y., on Cornus. Re-examination of the material shows that the host is Cephalanthus occidentalis and that the fungus thereon is Diatrypella cephalanthi (Schw.) Sacc. Unless other and authentic records exist of the occurrence of D. aspera, it must be omitted from New York lists.

Diatrypella missouriensis E. & E.

On dead branches of Corylus. West Albany. C. H. Peck. November (as Diatrypella frostii (Peck) Sacc.). The narrow, relatively few-spored asci and the other characters appear to distinguish this from D. frostii, the typical form of which is found on Acer.

Dinemasporium hispidulum (Schrad.) Sacc.

On dead and decorticated shoots of Sambucus canadensis. North Greenbush. C. H. Peck, June. Also collected by Peck on decayed wood of Ulmus at Menands, and on shoots of Viburnum dentatum at West Albany.

Dinemasporium robiniae Gerard

D. acerinum Peck

Poughkeepsie, on decorticated wood of Robinia pseudoacacia, W. R. Gerard (cotype material). Albany, on decorticated wood, of Ulmus americana, C. H. Peck. Buffalo, on decorticated wood of Acer, G. W. Clinton (type of D. acerinum Peck, 26th Rep't, p. 77). Bethlehem, on decorticated wood of Ulmus, C. H. Peck (as D. hispidulum var.). North Greenbush on decorticated wood of Populus deltoides, C. H. Peck (as D. acerinum). Petersburg on decorticated wood of Acer, C. H. Peck (as D. robiniae). Carlton, Orleans county, on dead, decorticated branches of Rhus toxicodendron, C. E. Fairman, March 1, 1888 (as D. acerinum Pk.).

The spores of D. robiniae Gerard are generally but not invariably smaller than the others cited. No other difference appears. The Albany collection on Ulmus has many spores larger than any seen in the so-called D. acerinum. It has also the longest pycnidial bristles, but it grades into D. acerinum and into the type of D. robiniae. A careful comparison of the material cited above would seem to indicate that D. acerinum is but a mere form, and not a constant form, of D. robiniae.

Diplodia sarmentorum Fr.

D. petiolaris Peck

In 1872 Doctor Peck described a Diplodia petiolaris on what he supposed to be fallen petioles of Fraxinus. An examination of the type material reveals the fact that he must have erred in the determination of the host which proves to be fragments of the dead stems of Menispermum canadense, and the fungus thereon proves to be Diplodia sarmentorum Fr. which has been collected several times in this State.

Dothiorella hicoriae Dearness & House, sp. nov.

Stromata seriately seated in the cortex, erumpent through the epidermis and sometimes throwing it off, often marked by the pale orange masses of exuded spores, black or grayish, globose or truncate, .5 to 1.5 mm in diameter, imperfectly locellate, 3 to 8 cells separated wholly or in part by thin, dark brown partitions, opening into one, two or more black, shining ostiolae. Spores orange in mass, hyaline, ovoid, 15 to 18 x 10 to 12 μ.

On dead bark of twigs of Hicoria alba. Greenbush, N. Y. C. H. Peck, May.

This appears quite distinct from a form of Dothiorella quercina C. & E., sometimes found on Hicoria, and which has (in the variety on Hicoria) spores much larger and elliptic, 22–36 μ in length.

Eutypa crustata (Fr.) Sacc.

On dead bark of Betula lutea. Bashfish, N. Y. C. H. Peck. July. This is reported in Europe on Acer pseudoplatanus and on Fagus sylvatica.

Gloeosporium aridum E. & E.

On living leaves of Fraxinus americana. Oneida, Madison county. H. H. House, August 1916. Also collected at Menands, Albany county by C. H. Peck, June 1888 (type of Gloeosporium irregulare Peck), and at Vaughns, Washington county, by S. H. Burnham, June 30, 1908.

Gloeosporium castanopsidis Dearness & House, sp. nov.

Spots gray-brown, epiphyllous, hardly visible on the lower side of the leaf, subcircular, 3 to 8 mm broad, not definitely bordered, sometimes confluent. Acervuli epiphyllous, numerous, large, close together, pale in the center, .1 to .5 mm; spores bacillary, 4 x 1.2 to 1.5 μ.

On living and languishing leaves of Castanopsis. Mount Shasta, California. C. G. Pringle, no. 117.

Gloeosporium hedericolum Maublanc

On edge of dead or languishing spots on leaves of the "English ivy," Hedera helix. Yonkers, N. Y. H. D. House, May 8, 1915.

Gloniella ovata (Cooke) Sacc.

On decorticated and weathered wood of Castanea dentata. Orient, N. Y. Roy Latham, no. 824. May 20, 1916. The type of this species (collected by Ravenel in Carolina) is said to be on oak.

Gloniella parvulata Dearness & House, sp. nov.

Perithecia 250 to 350 μ in diameter, scattered, nearly black, short-elliptic, dimidiate, erumpent but covered by a very thin layer of wood-fibers, striate where exposed; mouth nearly round or short-cleft. Asci 60 to 95 x 12 to 15 μ, 6 to 8 μ thick at the apex; paraphyses abundant, longer than the asci. Sporidia hyaline, spirally 2 to 3-seriate, 3 to 5-septate, mostly 3-septate, constricted, the second cell from the top widest, 20 to 24 x 6 to 8 μ.

On decorticated and weathered wood of Thuja occidentalis. Brownsville. C. H. Peck, June.

Gloniella vaccinicola Dearness & House, sp. nov.

Perithecia black, minute, 90 to 250 μ in diameter, round or ovate, seated in the cortex, thickly scattered, stellately rupturing the cuticle; lips or rim not definitely distinct from the black paraphysal layer overlying the hyaline asci. Asci parallel, 75 to 90 x 10 to 12 μ, paraphyses not distinct between the asci, interwoven in a thick layer, 15 μ thick, above them. Sporidia fusoid, hyaline, 3 to 5-septate, 18 to 21 x 4 to 5 μ, obliquely 2 to 3-seriate in the asci.

On dead branchlets of Vaccinium corymbosum. Sandlake, N. Y. C. H. Peck (no date given). This was designated by Doctor Peck as Sphaeria vaccinicola Schw., the type of which is said to be sterile, and which is probably a quite different species.

Glonium pruni Dearness & House, sp. nov.

Perithecia dimidiate, subcarbonous, dull black, evenly and thickly scattered, elliptic at base, .3 to .5 x .15 to .20 mm subcuticular, opening by a nearly round pore or a short cleft. Asci 75 to 100 x 10 to 12 μ, sessile, clavate-cylindric, narrow at the base, overtopped by the linear, branching, hyaline paraphyses. Sporidia hyaline, uniseptate, biseriate in half to three-fourths of the length of the asci, somewhat constricted, 13 to 16 x 4.5 to 5.5 μ.

On the bark of dead branches of Prunus pennsylvanica. Catskill mountains. C. H. Peck (no date).

Glutinium exasperans Fr.

On decorticated and weathered wood of Pinus strobus. Long Lake, N. Y. C. H. Peck, July.

Hysterium proteiforme Duby

On dead bark of Ulmus americana. New Baltimore, N. Y. C. H. Peck, May.

Illosporium coccinellum Cooke

Forming tiny bright red dots on the dead bark of spruce (Picea rubens). North Elba, N. Y. C. H. Peck, August.

Labrella celastri Dearness & House, sp. nov.

Pycnidia black, shining, thickly scattered, separate, sometimes confluent, circular or subcircular, cleft lengthwise sometimes cleft circularly, 100 to 200 μ in diameter. Conidia hyaline, 4 x 1 μ, on narrow conidiophores, 8 to 15 μ long.

On dead stems of Celastrus scandens. Karner, Albany county. H. D. House, April 29, 1916.

Leptothyrium celastri B. & C., founded upon a New England collection, agrees with this in the main according to the description, except that the conidia are described as 25 μ long.

Laestadia caricis Dearness & House, sp. nov.

Perithecia depressed-globose, scattered, black with a whitish stoma, minute, 90 to 100 μ, innate, opening through the upper cuticle of the host leaf. Asci aparaphysate, ovate to cylindric, 33 to 60 μ, mostly 45 to 50 x 8 to 10 μ. Sporidia hyaline, subelliptic or fusoid, inequilateral, usually wider in the upper half, 12 to 14 x 3.5 to 4.5 μ, some of them appearing pseudoseptate.

On dead leaves of Carex stricta. Carey pond near Camp Fulton on Fourth lake, northern Herkimer county, N. Y. H. D. House, August 9, 1917.

The dead leaves of Carex stricta at Carey pond bear in addition to the Laestadia, an inextricable mixture of other fungi, including a Leptosphaeria, an Alternaria, a Cladosporium, a Sporodesmium and a Hysteriaceous species.

Laestadia coptis (Schw.) E. & E.

(Sphaeria coptis Schw. Syn. Amer. Bor. n. 1783)

On languishing leaves of Coptis trifolia, near "Cohasset" on Fourth lake, northern Herkimer county, H. D. House, June 27, 1917 (with Septoria coptidis B. & C. on same leaves). Also collected at Sandlake, Rensselaer county, by Dr C. H. Peck, May.

Laestadia smilacinae Dearness & House, sp. nov.

Perithecia black, globose-conic, thickly scattered over the whole leaf or upon large parts of it, innate, erumpent through both surfaces of the leaf, but chiefly through the lower surface, 90 to 100 μ in diameter; stoma a pore, mostly bordered or stuffed with whitish matter. Asci 20 to 30 in a perithecia, aparaphysate, cylindrical, 40 to 60 x 10 to 12 μ. Sporidia irregularly elliptical, continuous, grumous, 12 x 6 μ.

On preceding season's leaves of Vagnera stellata. Karner, Albany county. C. H. Peck, April.

Rarely a spore is seen which is apparently septate and suggesting Mycosphaerella, but the septation, if real, is so rare that the species is placed in Laestadia. In this connection it might be noted that Sphaeria polygonati Schw. on an allied host, might possibly be the same as this, but the description is so incomplete and vague, that it is impossible to say whether it is the same as Laestadia smilacinae or not.

Leptosphaeria acuta (Moug. & Neestl.) Karst.

On dead stems of Collinsonia canadensis. North Greenbush. C. H. Peck, July. Sporidia yellowish brown, 30 to 40 x 4 to 5 μ. This species is described from Europe on dead stems of Urtica, Vitalba and Solanum.

Leptostromella chenopodii Dearness & House, sp. nov.

Pycnidia pale yellowish brown, thickly scattered, mostly circular and about .2 mm in diameter, occasionally elongate or irregular, up to .5 mm by .2 mm. Ostiolum present and agreeing in shape with the pycnidium, circular to elongate. When the pycnidia are numerous the cuticle is generally raised and imparting to such areas of the stem a pale or silvery color. Conidia long, narrow and hamate, 15 to 30 x 1.5 to 2 μ, on short narrow conidiophores.

On dead stems of Chenopodium album. Orient, N. Y. Roy Latham, April 19, 1915.

Many of the pycnidia are small, nearly circular bodies and were it not for the usually distinct ostiola this might be taken for a species of Melophia.

Leptothyrium castanicolum E. & E.

On fallen leaves of Castanea dentata. Bolton, Warren county, N. Y. C. H. Peck, September 12, 1901.

Lophiostoma insidiosum (Desm.) Ces. & DeNot.

On dead decorticated shoots of Sambucus canadensis L. North Greenbush. C. H. Peck, June (year not indicated). This fungus has been identified in Europe upon a wide range of hosts and is also subject to great variation, no less than thirteen forms being mentioned by Saccardo (Syll. 2: 704).

Lophiotrema praemorsum (Lasch) Sacc.

On dead stems of Rubus strigosus. West Albany. C. H. Peck, October. (Reported as Lophiostoma jerdoni B. & Br.). Catskill mountains, on dead stems of Rubus odoratus. C. H. Peck (reported as Lophiostoma bicuspidata Cke.).

Macrosporium saponariae Peck

On living and languishing leaves of Silene stellata. Karner, Albany county, N. Y. H. D. House, October 28, 1916.

Marsonia potentillae (Desm.) Fisch.

On living and languishing or nearly dead leaves of Argentina anserina (L.) Rydb. (Potentilla anserina L.), North Bay, Oneida county. H. D. House, August 17, 1917.

Ascochyta colorata Peck, represented by several collections on leaves of Fragaria, in the state herbarium, seems to be the same. Both have somewhat curved hyaline spores 19 to 22 x 4 to 4.5 μ. Marsonia potentillae is said by Fuckel to be the conidial stage of Venturia potentillae (Fr.) Cooke. Not reported from New York under that name, although Peck has collected it at North Greenbush on Potentilla canadensis and determined by him as Dothidea potentillae (Schw.)

Melanomma inspissum (Schw.) Cooke

On decorticated wood of Fagus grandifolia Erhr. Ampersand, N. Y. C. H. Peck, September 1896. The minute ostiola and the triseptate, fuscus spores, 12 to 14 μ long separate this from M. pulvis-pyrius (Pers.) Fckl.

Metasphaeria squamata (C. & E.) Sacc.

On decorticated and weathered wood of Pinus. Santa Rita mountains, Arizona. C. G. Pringle, no. 50. May 29, 1881.

Mycosphaerella opuntiae (E. & E.) Dearness, comb. nov.

(Sphaerella opuntiae E. & E. Jour. Myc. 1888, p. 97.)

On dead or languishing leaves of Opuntia opuntia (L.) Coult. Long Island, C. H. Peck (date not indicated).

Mytilidion fusisporum (Cooke) Sacc.

On decorticated and weathered wood of Pinus strobus. North Elba, Essex county. C. H. Peck, August 1898. Described by Cooke on bark and branches of pine in England.

Patellaria atrata (Hedw.) Fr.

(Lecanidion atratum Rabenh.)

On decorticated and much weathered wood of Acer. Menands, Albany county. C. H. Peck.

Phlyctaena arcuata Berkeley

On dead stems of Helianthus annuus. Orient, Long Island. Roy Latham, no. 726. April 2, 1916. Spores filiform, arcuate to falcate, 25 μ long.

Phyllachora graminis panici Shear

On leaves of Panicum clandestinum. Hempstead, Long Island. H. D. House, September 8, 1916.

Phyllachora haydeni (B. & C.) Dearness, comb. nov.

Dothidea haydeni B. & C. North Am. Fungi. n. 881.
Ophiodothis haydeni Sacc. Syll., 2: 653. 1883.

Prof. G. F. Atkinson (Jour. Myc., 11: 257) says that the Berkeley material shows only conidia. Professor Dearness has collected this on Solidago stems in Ontario, June 1888, and found asci, with spores 15 x 3 to 5 μ; conidia 15 to 50 x 3.5 μ. What appears to be the same is a collection by J. B. Ellis, Newfield, N. J., October 1874, on dead stems of Aster dumosus (comm. to Peck).

Phyllosticta omphaleae Dearness & House, sp. nov.

Discoloring extensive areas, 2 to 3 cm broad along the margin of the leaves, sordid yellow at first and later whitening, bordered by a raised reddish-brown margin. Pycnidia epiphyllous, erumpent, black, very numerous, 4 or 5 to a square millimeter in the whitened portions of the spots; the perforate stomata enlarging with age giving a melanconial appearance to the old pycnidia. Conidia hyaline, oblong, continuous to 2-nucleate, 4 to 6 x 2 μ, on sporophores of various lengths up to 15 μ.

On leaves of Omphalia sp. (Euphorbiaceae). Cajimas, Cuba. C. F. Baker, no. 2889. March 14, 1906 (Type in herbarium of N. Y. State Museum).

Ramularia impatientis Peck

Doctor Peck (34th Rep't, p. 47) states that the spores are epiphyllous. Specimens collected later by Peck at Genesee falls, on leaves of Impatiens fulva, have spores amphigenous and even more abundant on the lower side of the leaf than on the upper surface.

Rhabdospora mirabilissima (Peck) Dearness, comb. nov.

Septoria mirabilissima Peck, N. Y. State Mus. Bul. 157, p. 33, 115. 1912.

On living stems of white pine seedlings, Saranac lake plantations. C. R. Pettis, April 1911. The spores are long and tortuous or ribbonlike with a peculiar greenish color. The characters place it in Rhabdospora rather than in Septoria.

It is obviously related to, and should be compared with authentic European material of Rhabdospora pini (B. & C.) Sacc. (Cryptosporium pini B. & C.). The fact that the disease is quite injurious to young living pines and has been found in the state nursery, makes further investigation desirable which may lead to its identification with the European species mentioned above.

Rhopographus clavisporus (C. & P.) Sacc.

On dead culms of Phragmitis phragmitis (L.) Karst. Bergen swamp, Genesee county. H. D. House, August 14, 1916.

The type (Hysterium clavisporum, Dothidea clavispora C. & P.) was collected on the same host at Tyre, September 1871. Doctor Peck also collected it at Watkins, N. Y.

Rosellinia obtusissima (B. & C.) Sacc.

On decorticated branches of Acer. Sandlake. C. H. Peck. Perithecia setose; sporidia very obtuse, elliptic, nearly as broad as long, 12 to 14 x 9 to 11 μ. The type of Sphaeria obtusissima B. & C. is from Pennsylvania.

Scleroderris fuliginosa (Pers.) Karst.

On dead twigs of Salix sp. Bald mountain near Fourth lake, northern Herkimer county. H. D. House, June 27, 1917.

Saccardo's description speaks of the "late ambiente-effuso" subiculum, which is again referred to in the note on character given below the description. Phillips, however, does not mention a subiculum. Otherwise the colors, size and septation of sporidia agree with Karsten's and Saccardo's descriptions.

Septoria coptidis B. & C.

The measurements given in Saccardo (Syll., 3: 526) call for sporules 25 μ long. On leaves of Coptis collected by C. H. Peck at Grassy pond in the Adirondack mountains, the spots and form of spores agree with the description, but the sporules are from 30 to 65 μ long, averaging about 45 μ long. The pycnidia are epiphyllous and from 72 to 125 μ in diameter.

Septoria hedeomae Dearness & House, sp. nov.

Spots brown, darker above, angular or suborbicular, mostly from 2 to 4 mm broad. Pycnidia epiphyllous, numerous, small, 35 to 65 μ in diameter; wall very thin, hardly visible if existent at the summit; sporules continuous, straight or curved, 24 to 33 x 1 μ.

On leaves of Hedeoma pulegioides. Highland Mills, N. Y. C. H. Peck.

The pycnidia on the leaves are much smaller and thinner walled and the sporules shorter and narrower than the corresponding characters of Septoria hedeomina Peck (Rhabdospora hedeomina Sacc.) on dead stems and calyces of the same host. Peck appears to have considered this a mere form of R. hedeomina.

Sphaeropsis ellisii Sacc.

(S. pinastri C. & E.)

On dead limbs and twigs of young white pine (Pinus strobus) which has been copiously channeled by a small beetle belonging to the genus Pityophthorus (det. by Felt). Between Elizabethtown and Keene, Essex county. R. G. Pierce, November 1916.

Sphaeropsis hedericola (Speg.) Sacc.

On languishing leaves of Hedera helix. Yonkers, N. Y. May 8, 1915. H. D. House. Except that it is on leaves instead of stems it also agrees with the description of Sphaeropsis hederae E. & E. and there is reason to believe that the two are synonymous.

Sporodesmium naviculum Dearness & House, sp. nov.

A dark-brown conidial stratum lines the interior of boat-shaped cavities in the decorticated, whitened wood, .7 to 1.25 mm long by .5 mm wide. The presence of the fungus has hindered the weathering of the contiguous wood fibers, leaving the cavity walls or naviculae .2 to .3 mm above the surrounding wood; these are regularly scattered, 5 to 8 to a square centimeter, easily visible by their prominence and color. Conidia at first hyaline, then brown, globular, muriform, 7 to 12 μ in diameter.

On weathered and decorticated wood of Juniperus virginiana. Albany, N. Y. H. D. House, July 1913.

Thyridium antiquum (E. & E.) Sacc.

On dead branches of Vitis. Helderberg mountains, Albany county. C. H. Peck, May.

Tympanis buchsii (Henn.) Rehm.

Biatorellina buchsii Hennings, Hedwigia, 42: 307. 1903.
Tympanis buchsii Rehm, Bayer Bot. Ges., 203. 1912.

On dead limbs of young white pines (Pinus strobus). Paul Smiths, N. Y. Collected by Edward Patnode, November 30, 1916 and communicated by C. H. Pettis, superintendent of state forests. This adds another saprophytic species to the long list of fungi found upon white pine in America.

Tympanis laricina (Fckl.) Sacc.

(T. pinastri *Rehm.*)

On shrunken dead areas of the cortex of living or languishing white pines (Pinus strobus). Between Elizabethtown and Keene, Essex county. R. G. Pierce, November 1916. Apparently secondary and not the cause of the shrunken areas of the cortex, since upon similar areas other species of fungi are frequently found.

Valsa pini (A. & S.) Fr.

On dead limbs of young white pines (Pinus strobus) near Paul Smiths, N. Y. Edward Patnode, November 30, 1916 (communicated by C. R. Pettis, superintendent of state forests). Between Elizabethtown and Keene, Essex county. R. G. Pierce, November 1916. Ithaca, H. H. Whetzel. Elizabethtown, C. H. Peck. North Elba, C. H. Peck. West Albany, C. H. Peck.

Valsa variolaria (Schw.) Cooke

On dead branches of Tilia americana. Hunter and Catskill. C. H. Peck.

Valsaria toxici (Schw.) Sacc.

On dead stems of Rhus radicans. Albany, N. Y. H. D. House, November 27, 1917 and January 18, 1918. Most of the material is the spermogonial and conidial stages and quite variable in the size of spores.

Vermicularia sambucina Ell. & Dearn.

On dead shoots of Sambucus canadensis. Helderberg mountains. C. H. Peck, May. Some of the pycnidia are considerably larger than those described in the type, but otherwise agree well with the type material.

Winterina crustosa E. & E., Sacc.

On decorticated wood. Catskill mountains. C. H. Peck. Some of the perithecia are stellately cleft. [Winteria crustosa E. & E.]

COLLYBIA CAMPANELLA PECK, AND ITS NEAR RELATIVES IN THE EASTERN UNITED STATES

BY GEORGE F. ATKINSON

This interesting species was described by Peck in 1907 (N. Y. Mus. Bul. 116, p. 19) from specimens collected by him on dead twigs of the arbor vitae, or white cedar (Thuja occidentalis) in a swamp at Horicon, Warren county, N. Y. (July 20, 1905). The plants were apparently not fully grown nor quite mature, as spores[1] were not described by Peck. Several collections of the species have since been made on the same host: in Ontario, Canada, March 1906, by C. Guillett, reported as Collybia stipitaria campanulata Peck (name only)[2]; at Houghton, Mich., August 17, 1906, C. H. Kaufmann, no. 522, and by H. D. House in a cedar swamp at Jordanville, Herkimer county, N. Y., June 23, 1917, and at Pecksport, Madison county, July 12, 1918. It was also collected by Doctor Peck on branches of the American yew (Taxus canadensis) at Indian Lake, in July 1901.

In the original description the pileus is described as " conic or campanulate," and all the other collections mentioned above were collected at the same stage of development, except those by House at Jordanville. In this collection nearly all the plants were full grown, the pileus fully expanded, some of the plants being much larger than any in the other collections above referred to, the larger ones reaching 5 cm high, with the pileus 18 mm broad.

It appears that the validity of this species has been questioned in certain quarters. In the North American Flora (9: 374. 1916), Murrill states that it belongs to the genus Crinipellis. Later, in the treatment of Crinipellis, he does not include it as a distinct species, nor does he list the name as a synonym under any of the species recognized from North America. But the description given under Crinipellis scabella appears to be drawn in such terms as to include Collybia campanella.

In view of this situation Doctor House recently sent me all the collections of Collybia campanella and C. stipitaria in the herbarium of the New York State Museum, requesting my opinion and later a critical note on the situation.

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[1] In the examination of the type material I have found a few spores. *G. F. A.*

[2] Ottawa Naturalist, 23: 59–60, 1907.

In order to determine the relation of Collybia campanella to C. stipitaria, it was necessary to have for examination reasonably typical examples of the European C. stipitaria of Fries. The type of Agaricus scabellus[3] (Consp. Fung. 189, pl. 9, fig. 6. 1805) is probably not in existence, and at the present time it is not feasible to attempt to get hold of the type of Agaricus stipitarius Fries (Syst. Myc., 1: 138. 1821) from Upsala, even if that type has been preserved. There are accessible, however, collections which, without any reasonable doubt, may be accepted as typical of Agaricus stipitarius Fries. These were collected by Th. M. Fries (son of Elias Fries) in the region of Upsala, Sweden, on tufts of grasses, September 1859, and distributed in Rabenhorst's Fung. Eur. no. 107 as Agaricus (Collybia) cauticinalis[4] I have examined the specimens of this collection in the Experiment Station herbarium of the Agricultural College at Cornell University.

The following synopsis presents the principal differential characters in a comparison of the two species:

Collybia campanella	**Collybia stipitaria**
Plants reddish brown tawny to mars brown.	Plants white to grayish brown.
Pileus in age not plicate.	Pileus in age more or less plicate.
Lamellae free, narrow, very thin and soft.	Lamellae adnexed to free, broad, ventricose.
Cystidia (sterile cells) on edge of lamellae, cylindrical clavate, straight or flexuose, with 1 to 3 or 4 short or blunt mucros which are themselves sometimes branched, 12 to 25 x 4 to 7 μ.	Cystidia (sterile cells) on edge of lamellae, cylindrical to subfusoid, clustered usually in densely packed tufts, straight or flexuose, simple, 24 to 30 x 3 to 4 μ, inconspicuous or rare on the sides of the lamellae.
Spores 7 to 9 x 3.5 to 4.5 μ.	Spores 7 to 10 x 4 to 6.

This diagnosis warrants the separation of Collybia campanella as distinct from Collybia stipitaria.

Lloyd reports Collybia campanella Peck in 1900 (Mycl. Notes, 5: 43, fig. 16) as Collybia stipitaria var. robusta. The specimens were growing "on fallen cedar limbs in a swamp," probably the white cedar (Thuja occidentalis). They represent the large specimens. He considers his variety as a form of Collybia stipitaria, approaching Collybia zonata,[5] indicating that C. zonata is only a form of C. stipitaria. Although the name, var. robusta, antedates Collybia campanella by seven years, the varietal name can not be used in place of the specific name campanella, according to article 49 of the International Rules of Botanical Nomenclature, 27, 1912.

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[3] According to the International Rules of Botanical Nomenclature, 1912, article 19, f; the species name Agaricus stipitarius Fr. takes precedence over Agaricus scabellus Alb. & Schw.

[4] In Summa Veg. Scand., 280. 1849, Fries employed Bulliard's name, Agaricus caulicinalis (in DeCandolle Flora Francaise 2: 192. 1805. Champ. France pl. 522, fig. 1. 1790, text page 545. 1809), with a typographical error in the spelling. It is very doubtful if Bulliard's plant is the same as Agaricus stipitarius Fries.

One of the collections received from the State Museum was typical Collybia stipitaria, and is the only typical representative of the species which I have seen in this country. It was collected by E. Bartholomew (no. 2238) and determined by Peck as Collybia stipitaria. The specimens were found growing on grass roots in a sandy pasture, Rooks county, Kansas, August 30, 1896. They agree in all particulars with the specimens in Rab. Fung. Eur. no. 107, referred to above. It is interesting to note that the Kansas specimens were collected on grass roots in an open field. Fries says of Agaricus stipitarius (Epicrisis 87. 1836), that it is abundant on the roots of grasses in fields, but never in woods or mountainous regions.

This raises the question as to the status of the rather common form in the eastern United States, which grows in the woods on twigs and leaves, and which goes quite generally under the name of Collybia stipitaria. Peck's critical mind led him to recognize this form as distinct from the Collybia stipitaria of Europe and he named it Collybia stipitaria var. setipes (38th Rep't N. Y. State Mus., p. 109. 1885). This I regard as a distinct species. The plants are taller and more slender than those of the two species treated above, ranging from 5 to 10 cm high, the pileus 4 to 10 mm broad. The pileus is pale gray to dark gray or umber. The lamellae are narrow adnexed. The cystidia are very characteristic, abundant on the edges of the lamellae and distributed for some distance on the sides, at least half way to the pileus in the specimens examined, but they do not project beyond the basidia. They are clavate with numerous short processes over the distal end (6 to 8 or 10 or more) and are 15 to 20 x 6 to 9 μ. These cystidia are very similar to those present in a number of species of Marasmius. The spores are 7 to 9 x 3 to 4 μ.

There remains to be considered a fourth species, Collybia zonata (Peck) Sacc. This species grows on dead branches, more rarely on leaves or wood mold, the plants are 3 to 8 cm high and the pileus with a spread up to 3 cm. It is umber to seal brown and usually the scales are arranged in prominent concentric zones. The lamellae are adnexed or free and narrow. Cystidia are absent on the sides of the lamellae, but are present on the edges. They are clavate, usually mucronate or abruptly acute, sometimes more or less irregular. They are much larger than the basidia, 30 to 35 x 12 to 15 μ. The spores are oboval, 4 to 6 x 3 to 4.5 μ. The species is very distinct from any of the three treated above.

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[5] Agricus (Collybia) zonata Peck, 24th Rep't N. Y. State Mus., p. 161. 1872.

While these four species are generally placed in the genus Collybia, they are foreign to the general characters of that genus. They are dry and nonputrescent. Two of them Patouillard places in his genus Crinipellis (Ess. Tax. Hym. Eur. 143. 1900), an assignment followed by Murrill (North American Flora, 9: 287. 1915). The chief characteristics of Crinipellis are the nonputrescent nature of the plants, the strigose hairy pileus, and the presence of salient, projecting, fusoid or unimucronate cystidia, that is, projecting beyond the basidia, and presumably on the sides of the lamellae as shown in Patouillard's figure (l.c.) from Crinipellis excentrica. None of the four species mentioned above has projecting cystidia, except Collybia zonata, where they project slightly on the edges of the lamellae. Only one of the species, Collybia setipes, has conspicuous cystidia on the sides of the lamellae, and they are clavate and multimucronate, not salient. The strigose hairy feature ("pellicle") of the pileus is the only character of these four species in which they differ from the usual concept of the genus Marasmius, and a number of students have remarked on the close resemblance of Collybia stipitaria to Marasmius, the nonputrescent nature, coriaceous texture, "inserted" stem, and form of the cystidia or sterile cells, etc.

Crinipellis was proposed by Patouillard (Jour. de Bot., 3: 336, 1 fig. 1889) to include plants with a more or less coriaceous texture like Collybia stipitaria and related species, as well as species of Marasmius having a fibrous pellicle. He later includes sessile species as well as some which had been assigned to Pleurotus and Lentinus (Tax. Hym. 143. 1900). In 1887 (Tab. Anal. Fung. 14. fig. 525) he describes and figures a cystidium in a lamella of Collybia stipitaria of the same size and shape as the basidia except that it tapers to a mucro and slightly projects above the basidia. Some of the sterile cells on the edges of the lamellae are of the same shape but I have not found them on the sides of the lamellae in the material examined.

The fibrous or hairy "pellicle" of the pileus alone does not appear to warrant the recognition of a distinct generic type. Although Murrill (North American Flora, 9: 287. 1915) recognizes the genus Crinipellis, it is evident that he does not consider the hairy "pellicle" in itself an important generic character since he includes plants with the pileus devoid of hairs but covered with spines (Crinipellis echinulata Murr. l. c. 288), a feature conspicuous in a number of species of Marasmius. Furthermore he transfers two of Patouillard's species of Crinipellis (Cr. asperifolia and Cr. calospora) to Pleurotopsis, a section of Marasmius including coriaceous forms which are resupinate when young, but the pileus varying in structure (North American Flora, 9: 238. 1915).

The four species with which we are concerned here seem to belong essentially in Marasmius. The mere fact that the hairs on the pileus are long does not warrant their separation from other coriaceous species with a fibrous "pellicle" such as are known in Marasmius, on the ground of difference in length of hairs alone and therefore the following arrangement is proposed for the species treated here.

Marasmius campanellus (Peck) Atkinson and House, nov. comb. Collybia campanella Peck, N. Y. State Mus., Bul. 116, p. 19. 1907.

Marasmius setipes (Peck) Atkinson and House, nov. com. Collybia stipitaria var. setipes Peck, 38th Rep't N. Y. State Mus., p. 109. 1885.

Marasmius stipitarius (Fries) Atkinson and House, nov. comb. Agaricus (Collybia) stipitarius Fr. Syst. Myc., 1: 138. 1821.

Marasmius zonatus (Peck) Atkinson and House, nov. comb. Agaricus (Collybia) zonatus Peck, 24th Rep't N. Y. State Mus., p. 61. 1872.

THE SPECIES OF PORIA DESCRIBED BY PECK

BY L. O. OVERHOLTS

The genus Poria of the Polyporaceae has long presented to mycologists an unsolved problem. In the broadest sense it includes all resupinate pore fungi, without regard to the color of the fruiting body or spores, the hymenial configuration, or whether annual or perennial. We are more accustomed to think of it, however, as including only those entirely resupinate species which otherwise would be referred either to Polyporus or Fomes as those genera have been limited by the writer within the last few years.

Dr W. A. Murrill of the New York Botanical Garden in 1908 brought together in the North American Flora, descriptions of a considerable number of those Porias with brown context, including a number of species described as new. Unfortunately in several cases the spore characters there recorded have proved to be erroneous. Aside from this publication no attempt has been made in this country at anything approximating a revision or a monograph of the genus in question. It is a problem, moreover, that will require several years of close and patient study before it can be adequately solved. For several years past the writer has paid special attention to this group of fungi, and consequently has accumulated a large assortment of collections, both through his own endeavors and through the sendings of others. Of late, a large amount of time has been spent in painstaking study to determine those characters which in this group of fungi should be regarded as of specific importance. As the work has progressed it has become more and more evident that the number of described species must be materially increased before the end is in sight. Scarcely a single consignment is received from correspondents in which there is not found one or more collections that are apparently sufficiently different from those previously studied to constitute distinct species. From no locality has this been so true as from the far northwest, where extensive collections have been made by Dr J. R. Weir.

In view of these facts it has seemed advisable that the problem be attacked from a slightly different angle. As a consequence, the present paper is offered as a contribution to a better knowledge of the taxonomy of this group of fungi. During his services as State Botanist of New York, Dr C. H. Peck described about twenty species of resupinate pore fungi, now referred, for the most part, to the genus Poria. The first of these was described in 1873. At that time and for many years thereafter mycologists apparently failed to grasp the idea that the higher fungi include a very large and varied assortment of closely related species. As a consequence they were apparently possessed of the idea that superficial characters were sufficient for the determination of species in most if not all cases.

As time has passed the need of microscopic characters in certain groups of fungi has been more and more emphasized until we are in danger of going too far to the other extreme and underemphasizing the importance of external form, coloration etc. In an effort to overcome the former of these tendencies the writer has undertaken a thorough investigation of the material left by Peck as representing the species he described. It has not been the writer's intention to pass judgment on the validity of these species but merely to supplement Peck's often meager descriptions with addiditional facts concerning characteristics not recognized by him.

The need of such a paper will be appreciated by those who have tried to fit their collections to the descriptions left by Peck. In some instances his description occupies less than three lines of printed matter. Most of them contain no mention of spores or other hymenial structures and these are often among the most useful characters that a plant will show. In preparing the paper it has been necessary to decide to what extent detail is necessary, and where general statements will suffice. In this the writer has been guided by his own experience in matching collections in the herbarium. Characters which have proved useless have been omitted. For example, it has been deemed unnecessary to state the thickness of the subiculum in microns when millimeters or fractions thereof will suffice. Neither is the thickness of the dissepiments nor the diameter of the tubes given in microns. The former is too much a question of age and maturity and is covered in sufficient detail in the statements regarding the size of the tubes in millimeters. It is possible, however, that forty years hence the descriptions here presented by the writer will be deemed as inadequate as are at the present time those published by workers forty years ago.

The presentation of each species conveniently divides itself into four sections.

1 Peck's description is reproduced exactly as it was published and is headed *Original description.* The reason for this is two-

fold. First, it brings together in one paper all of Peck's descriptions of Porias — a convenience that will be appreciated by those who have had to turn from one report to another to locate them. Second, it enables the student to see at a glance what in this paper has been added to each of Peck's descriptions.

2 A section has been headed *Notes* and contains a more extended account of the present condition of the type collection, characters not included by Peck, explanation of discrepancies of one form or another where such occur, and observations on the distinguishing characteristics and probable relationships of the species.

3 The characters brought out in the two preceding sections are combined into a technical *Redescription*. This of course, involves repetition, but it puts into a paragraph a concise description of each species and makes it available for future use.

4 Each species is illustrated as fully as material permits. Three types of illustrations are used. (*a*) Natural size photographs (unless otherwise noted) of at least a part of the material in the type collection. Where possible this material was chosen so as to show as wide a range as possible in the variations of the species. In some instances material is extremely scanty and the results more or less unsatisfactory. (*b*) Microphotographs of sections through the hymenium of each species. Wherever possible these are from cross-section preparations but in a few cases the tubes were so short that vertical sections were resorted to. In passing judgment on these microphotographs it should be borne in mind that they are from free-hand sections, made by the writer, and cut and mounted as described in a previous paper (Ann. Missouri Botanical Garden, 2: 676. 1915), but stained in a 1 per cent solution of water eosin. The mounts were made in 66 per cent glycerine to which a few drops of a 10 per cent solution of acetic acid had been added. The acid prevents the glycerine from extracting the stain from the sections. It should also be remembered that the dried material from which these sections are made has been in the herbarium for as many as forty years in some cases, and moreover that in some cases type material is extremely scanty and is too valuable to be diminished to any extent by continued sectioning in an attempt to obtain a section of extreme thinness. It is hoped, however, that these sections will show in a suitable manner the relative size of the pores, the relative compactness of the dissepiments, and the cystidia, where such are present. These photographs are all magnified to the same extent, namely, about 160 diameters unless otherwise indicated, and consequently are directly comparable

one with another. (*c*) Line drawings of spores and hyphae made with the aid of a camera-lucida, and consequently comparable with one another in point of magnification. Special attention has been directed to the diameters of the hyphae, the presence or absence of clamp connections, the character of the branching if present, and the presence or absence of cross walls. Just how many of these points will eventually prove to have diagnostic value is not known at present. Unless otherwise stated, the hyphal characters given apply to those of both the trama (dissepiments) and of the subiculum. They have been obtained from teased preparations as described in the earlier article referred to.

A word of explanation may not be amiss regarding the writer's use of the terms *trama, dissepiments* and *subiculum.* The first two terms are used nearly synonymously but a more or less superficial shade of meaning has been maintained. The walls of the tubes, at the surface of the hymenium (that is, at the mouths of the tubes) are designated as the dissepiments as they are seen with the naked eye or by the use of a hand lens. Thus one speaks of the comparative thickness or thinness, the color, or the pubescence of these dissepiments. The interior of these dissepiments is designated trama, and of course its structure is invisible except under the microscope. Thus the writer speaks of the characteristics of the hyphae of the trama, meaning those hyphae (exclusive of basidia, paraphyses or cystidia) of which the dissepiments are composed and from which the hymenial elements are produced. The term subiculum is used to designate that layer of hyphae from which the tubes arise. There may thus be a subiculum before the tubes are produced, and in most cases it persists after they are well formed, as a thin layer separating the tubes from the substratum.

The color terms used in the writer's *Notes* and *Redescriptions* of the various species (except where credited to Peck) are those of Ridgway's Color Standards and Color Nomenclature, 1912 edition. In order to follow closely the exact shade of meaning of the various terms used access to a copy of this book is a necessity. In determining the colors shown by these fungi at present it is well to bear in mind that specimens mounted on a herbarium sheet (as many of Peck's types are) present a serious obstacle which may express itself in discrepancies in applying the color terms of the manual. This is because it is impossible to bring into close proximity a given specimen on such a sheet and the representation of any particular color shown in the book. Even if determined accurately, the possibility of considerable color variation in the plants on drying is not excluded. It is often possible to take a herbarium specimen, wet it in water and dry it out again, and have it present quite a different shade of color from the one it first possessed.

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Poria attenuata (Peck) Cooke

Plate 1, figures 1–6; plate 2, figures 1–2

Grevillea, 14: 110. 1886.

Polyporus attenuatus Peck, Buffalo Soc. Nat. Sci. Bul. 1, p. 61. 1873. 26th Rep't N. Y. State Mus., p. 70. 1874.

Original description. Resupinate, effused, very thin, separable from the matrix, pinkish-ochre, the margin whitish; pores minute, subrotund, with thin acute dissepiments.

Prostrate trunks of deciduous trees. Croghan. September.

The pores are scarcely visible to the naked eye.

Notes. This is the first species of Poria described by Peck, and the description is extremely meager. Fortunately, the species is rather common in the eastern United States and its characters easily recognized. The type collection is quite small, consisting of only four small fragments less than 6 cm long and 2 cm broad. One of these is reproduced in plate 1, figure 7. These specimens do not have the exact coloration typical of most collections seen by the writer, but all are alike in microscopic structure.

The plants are annual, thin, and separate rather easily from the substratum. The color of the hymenial surface of the type collection is near vinaceous buff or avellaneous. In other collections, however, the color is light pinkish cinnamon to light ochraceous salmon. Sometimes darker colors, approaching cinnamon, are met with. In one especially light-colored collection made by the writer the hymenium when fresh was light buff or cream color. In all cases the fructifications are surrounded, at least in part, by a narrow, white, finely pubescent or nearly glabrous margin, less than

1 millimeter broad, as shown in plate 1, figure 1. This margin is fairly regular, and not fimbriate. The thickness of the hymenium-producing region in dried plants is about half a millimeter in the types but in other collections as much as 3 mm. This thickness is made up of a very thin but conspicuous subiculum and the rather short tubes. The mouths of the tubes are angular or subangular and with a diameter of 5 to 6 to the millimeter. The dissepiments are rather thin but remarkably entire. The hymenium often and perhaps typically shows a decided silky luster when viewed in oblique positions.

The spores are ellipsoidal or inclined to elliptical and hyaline (plate 1, figure 2). They are 3 to 4 μ long and 2 to 3 μ broad. There are many conspicuous encrusted cystidia in the hymenium, but in some collections they appear to remain embedded in the tramal tissue and not project beyond the basidia. In other collections they project very conspicuously (plate 2, figure 1a) and usually obliquely into the lumen of the tubes. They are best seen in vertical sections of the hymenium as shown in plate 2, figure 2. In cross sections they are often to be identified only by their cross section views (plate 2, figure 1-b) as even where they do project into the tubes they do so obliquely and so are cut crosswise in such sections. In macerated or teased preparations their true nature is easily made out. They are simply the enlarged and encrusted ends of ordinary hyphae as shown in plate 1, figures 3 and 4. They measure 60 to 80 μ in length and are 7.5 to 10 μ thick. The hyphae of the trama and the subiculum are rather compactly arranged, and are colorless, only rarely branched, sometimes quite flexuous though ordinarily only moderately so, and no cross walls are visible. They vary in diameter from 2 to 4 μ. There are no clamp connections (plate 1, figures 5 and 6).

Lloyd has stated (Mycological Notes, 2: 374. 1908) that this species is the same as Poria eupora Karsten. From unauthenticated specimens I have seen I am of the same opinion. Also P. nitidus A. & S. (ex Egeland, Norsk. Res. Poresv. p. 151) is apparently a closely related species. Poria myceliosa and Poria fimbriatella, both described by Peck, are somewhat similar but of different coloration and with smaller spores. Also the former species is without cystidia and has distinct cross walls and clamp connections in the hyphae.

Poria attenuata appears to be quite frequent in the eastern United States, but among a large series of western collections from various localities and different collectors this fungus has not been found. It is known to grow on witch hazel, oak, maple, and alder, and S. H. Burnham says he finds it frequently in New York on basswood and ironwood. Several collections were made by the writer in New Hampshire in the summer of 1918. Its decaying effect seems to be very slow and long drawn out.

Redescription. Effused for several centimeters on wood or bark, annual, separable, thin (less than 1 mm), more or less surrounded by a thin, narrow, white, slightly pubescent border not more than 1 mm broad; subiculum thin but conspicuous, light colored; tubes less than .5 mm long in dried plants, their mouths pinkish ochre (fide Peck) to light buff, light pinkish cinnamon, or light ochraceous salmon when fresh, not much changed on drying though sometimes inclining to cinnamon, usually glistening, more or less angular, thin walled but entire, averaging 5 to 6 to a millimeter; spores ellipsoidal or slightly elliptical, hyaline, 3 to 4 x 2 to 3 μ; cystidia abundant, sometimes mostly embedded but more often conspicuously and obliquely projecting, hyaline, encrusted, 60 to 80 x 7.5 to 10 μ; trama and subiculum compact, of hyaline, thin-walled, nearly simple hyphae, 2 to 4 μ in diameter, apparently without cross walls; clamp connections lacking.

On dead wood and bark of deciduous trees.

Type locality: Croghan, N. Y. C. H. Peck. Rather widely distributed through the eastern states as far west as Missouri.

Poria attenuata var. **subincarnata** Peck

Plate 2, figures 3-6

48th Rep't N. Y. State Mus., p. 118 (Bot. ed. 20). 1896.

Original description. This differs from the typical form in the paler color of the pores. It grows on hemlock bark and forms small patches rarely more than 1 inch in diameter. N. Y. Sept. Shear.

Notes. This, originally described as a variety of Poria attenuata, is a distinct species. It has little resemblance to that species except in its thickness and in the size of the pores. It grew on the bark of hemlock, while the typical species, so far as known, is confined to deciduous wood. Its color is considerably different from that species, and the spores (plate 2, figure 4) are allantoid, while those of the species are ellipsoidal. In some respects it is similar to resupinate forms of Polyporus semipileatus Peck, but appears to differ somewhat from that species. The writer is certain that the plant is not a variety of Poria attenuata, but is not ready to suggest any other disposition of it at present. The type collection contains but a few small fragments of the plant (plate 2, figure 3). An excellent collection of this plant was obtained by the writer in New Hampshire in 1918.

Redescription. Effused, annual, probably separable, with a narrow, white, pubescent margin about .5 mm broad; subiculum extremely thin, whitish; tubes less than .5 mm long, their mouths light buff to tilleul buff at present, apparently somewhat incarnate when fresh, subangular, rather thin-walled, averaging 5 to 6 to the millimeter, entire, or gaping in oblique situations, the hymenium considerably cracked when dry; spores allantoid, hyaline, 4 to 5 x 1 μ; cystidia none, but large subcylindrical pegs of hyphae project at irregular intervals into the lumen of the tubes; trama and subiculum compact, of hyaline, thin-walled hyphae 2 to 3.5 μ in diameter, rarely branched, some heavily encrusted with coarse crystals but mostly smooth; cross walls not conspicuous and in many hyphae apparently lacking; clamp connections lacking.

On fallen branches of Tsuga canadensis.

Type locality: Alcove, N. Y., C. L. Shear. Also in New Hampshire.

Poria aurea Peck

Plate 3, figures 1–4; plate 4, figures 1–2

43d Rep't N. Y. State Mus., p. 21. 1890.

Original description. Effused, forming patches of several inches in extent, 2 to 3 lines thick, separable from the matrix, golden yellow; subiculum thin, subgelatinous, the young margin byssoid or fimbriate, greenish yellow, soon disappearing; pores small, subrotund, elongated, the dissepiments thin, rather soft; spores minute, subelliptical, .00016 to .0002 in. long .0008 to .00012 broad.

Decaying wood of maple, Acer saccharinum. Sevey.

Apparently closely related to Poria xantha, but separable from the matrix and remarkable for its somewhat gelatinous subiculum. It is an attractive species.

Notes. Considerable confusion exists as to this species. The herbarium sheet at Albany contains three different collections. The specimens marked types are four in number. According to the original description, the type collection was made at Sevey, N. Y., in July, from the wood of Acer saccharinum, and the single label on the herbarium sheet records that as the substratum. But the other two collections are both from wood of coniferous trees and one of them agrees in all respects with the specimens on

Acer. This one was collected on pine wood at Ithaca, N. Y., by G. F. Atkinson and is referred to by Peck in Report 51 : 299. 1898. The other collection is from pine bark and is quite different, agreeing very well with specimens of Poria subacida. There is also one collection in a herbarium box, from C. H. Fairman, Lyndonville, N. Y., on hemlock, October 1910, referred by Peck as " Poria aurea — Myriadoporus form." These specimens do not agree with the types and are not considered as that species. Several facts warrant the conclusion that the specimens from Acer should be regarded as the types. Among these may be mentioned the fact that in the original description, Sevey is given as the type locality and this locality was evidently the one first written on the herbarium label. The locality of the Ithaca collection evidently was noted at another time and perhaps by a different person, as the handwriting seems different. No locality is given for the collection from pine bark. The speciments on Acer are distinct from any other of Peck's species and are different from any species known to the writer.

The largest specimen is 10 cm long and 4 cm broad but is incomplete. The color of the hymenial surface in these specimens is between cartridge-buff and honey yellow. Mature specimens have no sterile margin but more immature ones sometimes have a very narrow white margin which is not, however, uniformly sterile. It is not at all fimbriate. The thickness of the hymenium-producing portion is 2 to 5 mm in mature specimens. Of this thickness practically all is made up of tubes, as little or no subiculum is present. The mouths of the tubes are angular and where best developed average 2 to 3 to a millimeter. The dissepiments are very thin but entire except when growing in oblique positions. In dried specimens they are quite fragile. The best developed specimen has a silky luster over the hymenium.

The spores of this species are oblong or short-cylindrical and with an oblique apiculus (plate 3, figure 2). The other end of the spore is more or less rounded. They are colorless, smooth, measure 5.5 to 7.5 μ in length and 2.5 to 3.5 μ in breadth. It will be noted that these spore characters are different from those assigned to the species by Peck. Those given here, however, are from the specimens on Acer. Peck's measurements agree with those of the spores from the specimens on pine bark, and they agree with those of Poria subacida. Abundant cystidia are present in the hymenium (plate 4, figure 1–2). They are large, hyaline structures often slightly encrusted at the apex, and quite variable in size and shape. They project conspicuously from between the basidia. Usually the apex is more or less pointed and they are largest at or just above the center. A peculiar feature of these structures is that they are apparently formed by several hyphal fusions. In crushed preparations of the hymenium as many as five or six hyphae go off from the base of these bodies (plate 3, figure 3). More rarely they appear to be the enlarged end of a single normal hypha. The tramal and subiculum hyphae are rather compactly arranged, are colorless, 2 to 3 μ in diameter, and with clamp connections and cross walls (plate 3, figure 4). The clamps are of a more semicircular outline than those of most species of fungi. On account of the small size of the hyphae they are somewhat difficult to locate at first. The size of the hyphae and the presence of connections, are other important points separating the specimens on Acer (types) from those on pine bark.

The affinities of the species are not clear. The general appearance is somewhat that of forms of Poria subacida or related species, but it differs in the more yellow color when fresh, the different spores, the presence of conspicuous cystidia, the diameter of the hyphae, the presence of clamp connections, etc. It probably belongs to a different group of species. In the several hundred collections of Poria thus far examined by the writer, none with this combination of characters has been found.

Not much can be stated regarding the decay produced by this species. The Acer substratum has been reduced to a friable cinnamon-colored mass that readily breaks up into small flakes. The decay in the coniferous substratum is more brown in color and can be powdered more easily.

Redescription. Annual, effused up to lengths of 10 cm or more, separable when fresh (fide Peck), with a fimbriate, byssoid margin (fide Peck) when young, this more or less disappearing in mature specimens, greenish yellow in color (fide Peck); subiculum thin and subgelatinous (fide Peck) in fresh specimens, practically obsolete when dry; tubes 2 to 5 mm long, their mouths golden yellow (fide Peck) when fresh, between cartridge-buff and honey yellow in herbarium specimens, angular when mature, thin-walled, entire, averaging 2.5 to 5 to a millimeter; spores oblong or short cylindric, rounded at apex, obliquely apiculate at base, smooth, hyaline 5.5 to 7.5 x 2.5 to 3.5 μ; basidia 3 to 4.5 μ in diameter; hyphae hyaline, branched, 2 to 3 μ in diameter; clamp connections and cross walls present.

On wood of both deciduous and coniferous trees.

Type locality: Sevey, N. Y. C. H. Peck. Also from Ithaca, N. Y., by G. F. Atkinson. Not otherwise known to the writer.

Daedalea extensa Peck

44th Rep't N. Y. State Mus., p. 21. 1891.

Original description. Resupinate, thick, coriaceous, often uneven or somewhat nodulose, the margin at first cottony and white, soon changing to brown, the subiculum slightly rufescent; pores large, unequal and labyrinthiform, in vertical places oblique, whitish; spores minute, oblong, .00024 to .0003 in. long, .0001 to .00012 broad.

Prostrate trunks of deciduous trees. Salamanca. September.

This forms patches two feet or more in length on the sides and lower surface of the trunk. It follows the inequalities of the surface, and in vertical places it becomes more or less nodulose or develops a thick obtuse margin, which is velvety-tomentose and at length dark-brown in color, but I have seen no reflexed margin. It is very suggestive of resupinate forms of Trametes mollis, but differs from it in the character of the pores, in the thicker subiculum and in the absence of any free margin.

Note. According to Dr H. D. House, nothing is left of the type collection of this species except a few wood fragments with very slight indications of a fungous mycelium. It is quite probable that the species will never be recognized from the above description alone. The description reads somewhat like one of the resupinate forms of Trametes serialis Fries, in which the hymenium had become lacerated and torn. The writer has seen from one of the New England states (New Hampshire) specimens of Trametes mollis B. & C. that would also answer the description fairly well.

Poria fimbriatella (Peck) Sacc.

Plate 4, figure 3; plate 5, figures 1–7; plate 22, figure 6

Syll. Fung. 6: 303. 1888.

Polyporus (Physisporus) fimbriatellus Peck, 38th Rep't N. Y. State Mus., p. 91. 1885.

Original description. Widely effused, thin, tenacious, separable from the matrix, with a thin white fimbriate margin and a white subiculum, running into rhizomorphoid branching strings of mycelium or forming a somewhat reticulated fimbriate membrane; pores minute, subrotund, equal, whitish inclining to cream color.

Under side of prostrate trunks of maple, forming extensive patches on the wood and bark. Osceola. Aug.

By its rhizomorphoid mycelium this species is related to Poria vaillantii, but the pores are smaller and not collected in heaps as in that species. By reason of its tenacious substance it is readily separable even from an irregular matrix.

Notes. With this species a question arises as to what shall be considered the type material. The herbarium sheet contains what are undoubtedly parts of two separate collections, and there is some doubt as to the identity of the two collections. One set of specimens (plate 22, figure 6) has nearly entire tube mouths and few mycelial strands and is undoubtedly from the type collection. The other set of specimens (plate 4, figure 3) has a more lacerated hymenium and better developed mycelial strands. When touched with a drop of KOH solution the former at once becomes black while the latter does not change color. There is also in the herbarium a collection in a small box that agrees exactly with the second set of specimens on the herbarium sheet, and undoubtedly those specimens were taken from this box (or collection) and mounted on the sheet. This collection, according to the label on the box, was made at Ampersand pond by Peck in September, and was taken from a maple substratum. The first collection is from Osceola and also on the prostrate trunk of maple. Undoubtedly the Osceola specimens are the types and are so regarded here. In internal structure the two collections are alike. The only differences in external appearance are the more lacerated hymenium, better development of mycelial strands, and the lack of color change in KOH for the Ampersand collection.

The specimens are rather irregular in shape and vary in size from 1.5 to 7 cm broad and 6 to 15 cm long. The color of the hymenial surface varies from cinnamon buff to warm buff or somewhat light ochraceous buff. Sometimes a very narrow, white, subfimbriate margin is present, but more often the entire margin is fertile. In either case small white rhizomorphic strands less than one-fourth of a millimeter in diameter may be present, but in some specimens they are absent. The thickness of the hymenium-producing portion varies up to 2 mm. Of this practically all is tube length, as the white subiculum is extremely thin. The mouths of the tubes when entire are more or less angular, and average 4 to 5 to a millimeter. The dissepiments are rather thin and, especially in one set of specimens, soon become much torn and lacerated so that the hymenium at times comes to have somewhat the appearance of specimens of Hydnum ochraceum (plate 4, figure 3), although the color is not quite so deep. In some specimens there is a very slight sheen or silkiness to the surface of the hymenium.

The spores are the exact counterparts of those of Poria myceliosa, except that they are slightly smaller. When seen on basidia before maturity they appear more or less globose. When mature they are ellipsoidal, hyaline, and measure 2 to 3 μ in length and about 1.5 μ in breadth (plate 5, figure 7). The basidia are rather small, never exceeding 3 μ in diameter. There are abundant cystidia in the hymenium. These project prominently into the lumen of the tube (plate 5, figures 1 and 2). At times they appear to be associated in small groups on certain walls of the tubes, but at other times they are evenly distributed. They are hyaline and rather heavily encrusted with small crystals. Their shape can best be made out by reference to the illustration on plate 5 (figures 2, 5 and 6). Sometimes they are shap pointed and at other times more blunt on the apex. They are 10 to 15 μ in diameter at the thickest points and project 10 to 30 μ beyond the basidia. A much greater length is embedded in the tramal tissue, however, so that the total length may reach 50 μ or more. The embedded portion is usually free from crystals and appears as a large, thick-walled, hyphalike structure. These cystidia are very much alike in both sets of specimens on the herbarium sheet, though in KOH solution those found in the one set are brownish in color.

The hyphae of the subiculum are colorless and practically simple, and no cross walls or clamp connections are apparent (plate 5, figure 4). Their diameter is 2 to 4 μ. Those of the trama are somewhat smaller, somewhat more branched and more flexuous, with a diameter of 1.5 to 3 μ (plate 5, figure 3). They are practically the same in both sets of specimens on the herbarium sheet.

The relationships of this species are clearly those of Poria myceliosa. The chief point of difference having diagnostic value is the presence of cystidia in the former species and the absence of cross walls and clamp connections. Another fact that may be of some significance is that Poria myceliosa has been collected only on the wood of coniferous trees while Poria fimbriatella is known only from the wood of deciduous trees. The length of the tubes in Poria fimbriatella is somewhat greater and their diameter somewhat less than in the other species, but in general coloration, rhizomorphic mycelial strands, and spores, the two are alike.

Specimens referred by the writer to Poria vaillantii (DC.) Fries, differ in the nearly pure white color and the larger spores.

The collections available for examination are not attached to the substratum and consequently give no idea of the nature of the decay produced. Both collections are said by Peck to be on maple wood. The data at present on the type collections does not cover this point.

Redescription. Effused, 6 to 15 cm long, 1.5 to 7 cm broad, separable, with or without a narrow (1 to 3 mm), white, subfimbriate margin, often with small white rhizomorphic strands; subiculum exceedingly thin, white, scarcely discernible in mature specimens; tubes sometimes nearly 2 mm long but often shorter, their mouths whitish inclining to cream color (when fresh ?, fide Peck), cinnamon buff to warm buff or light ochraceous buff in herbarium specimens, more or less angular, with rather thin dissepiments, sometimes lacerated and the hymenium somewhat irpiciform, averaging 4 to 5 to a millimeter; spores ellipsoidal, smooth, hyaline, minute, 2.5 to 3.5 x 2 μ; basidia 2.5 to 3 μ in diameter; cystidia abundant, 10 to 15 μ in diameter at the thickest part, projecting prominently for 10 to 30 μ, the tips pointed and encrusted with coarse granules, the base embedded in the trama and unencrusted; tramal tissue fairly compact, composed of thin-walled, colorless, somewhat branched hyphae, 2 to 3.5 μ in diameter; subiculum hyphae nearly simple, 2 to 4 μ in diameter; clamp connections lacking; cross walls invisible.

On prostrate trunks of maple.

Type locality: Osceola, N. Y. C. H. Peck. Also collected at Ampersand pond, N. Y., on maple trunk. C. H. Peck. Not otherwise known to the writer.

Poria griseoabla (Peck) Sacc.

Plate 5, figure 8; plate 6, figures 1–5

Syll. Fung. 6: 306. 1888.

Polyporus (Physisporus) griseo-albus Peck, 38th Rep't N. Y. State Mus., p. 91. 1885.

Original description. Effused, thin, tender, adnate, uneven, scarcely margined, indeterminate, grayish-white, with a thin pulverulent subiculum; pores very minute, subrotund, often oblique.

Soft decaying wood of deciduous trees. Osceola. July.

The pores are sometimes collected in little heaps or tubercles as in P. molluscus and P. vaillantii. In the dried state they are slightly tinged with creamy yellow.

Notes. This is one of the earlier species of Poria described by Peck, and the description is entirely inadequate for the recognition of the species. The type collection is rather scanty, consisting of about eight small fragments of the substratum, the largest of which is only 4 cm in diameter. This larger fragment is fairly well covered by the fungus (plate 5, figure 8), but the others bear only small scattered fructifications, the diameter of which may not exceed 5 mm. In other words, the fungus varies in size from 5 mm to about 4 cm broad. The color of the hymenial surface varies from pale smoke gray to pinkish buff or cinnamon buff. The subiculum is fertile to the margin. The margin is not fimbriate and there are no rhizomorphic strands. The fructification is extremely thin, not more than one-fourth of a millimeter thick, and no subiculum is discernible except with a hand lens. The tubes are extremely short. Their mouths are nearly circular in outline and average 4 to 6 to a millimeter. In the thinner parts of the subiculum these tubes appear as small holes entirely through the fructification. The dissepiments are rather thin but entire. There is no sheen or silkiness to the hymenium.

The spores are oblong or short-cylindrical, sometimes curved, and sometimes pointed at the base. They are colorless, smooth, and measure 4 to 5 μ in length and 1 to 2 μ in breadth (plate 6, figure 5). They are thus of a somewhat different type from the small, allantoid spores such as are found in Poria odora and are characteristic of such species of Polyporus as the Polyporus versicolor and P. chioneus group. The basidia are 2 to 3 μ in diameter. Their origin is at times rather peculiar and unlike that of any other species known to the writer. Instead of the basidium arising terminally from more or less elongated hyphal branches, they here often arise in a series of as many as ten or even more from *one side* of a hypha in the hymenial region, as shown in the illustration (plate 6, figure 2). Usually, or perhaps always, the end of the hypha is broken up into a number of short cells each of which gives rise to a basidium, though this fact could not be determined in all cases. In many cases the basidium is cut off from its basal cell by a cross wall, though this was not always evident. This manner of origin of the basidia is frequently seen in crushed preparations of the hymenium, and in several cases spores were seen attached to these basidia. In other cases, however, hyphae were seen to give off a number of upright branches, closely arranged, and each terminating in a basidium. The tramal and subiculum tissue is fairly compact and is made up of hyphae that vary considerably in size. Some are 5 to 7.5 μ in diameter and composed of short cells 25 to 50 μ long (plate 6, figure 1, 3). For the most part they are slightly encrusted with small scattered crystals. Other hyphae, especially in the trama, are considerably smaller, with a diameter of 2.5 to 5 μ (plate 6, figure 2). Hyphal fusions are common in hyphae of both sizes. There are no cystidia in the hymenium. No clamp connections have been observed.

The species is quite distinct from any other of Peck's species in the very thin fructification, and the presence of the large hyphae, sparingly encrusted and composed of short, loosely joined cells.

The specimens are from very rotten spruce wood and nothing can be determined as to the type of decay produced.

Redescription. Annual, not widely effused, .5 to 4 cm in diameter, inseparable (fide Peck, though with appearance as if it might be separable), fertile to the margin; subiculum not visible in herbarium specimens; tubes less than .25 mm long, their mouths grayish white (fide Peck) in fresh specimens, pale smoke gray to pinkish buff or cinnamon buff in herbarium specimens, circular, thin-walled, entire, averaging 4 to 6 to a millimeter; spores hyaline, oblong or short cylindrical, sometimes curved, often pointed at the base, 4 to 5 x 1 to 2 μ; basidia 2 to 3 μ in diameter; tramal and subiculum tissue compact, some hyphae 5 to 7.5 μ in diameter and of short cells 25 to 50 μ long, others 2.5 to 5 μ in diameter and of longer cells, both kinds much branched, frequently anastomosing, and usually slightly encrusted with a few scattered crystals; clamp connections absent.

On well-rotted wood of deciduous trees.

Type locality: Osceola, N. Y. C. H. Peck. Not otherwise known to the writer.

Poria indurata (Peck) Cooke

Plate 6, figures 6–7; plate 7, figures 1–3

Grevillea, 14:115. 1886.

Polyporus (Resupinati) induratus Peck, 31st Rep't N. Y. State Mus., p. 37. 1879.

Myriadoporus induratus Peck, Torrey Club Bul. 11, p. 27. 1884.

Original description. Effused, hard, determinate, 1″–2″ thick, inseparable from the matrix, almost wholly composed of minute, subrotund vesicular pores, yellowish or pale-ochre, the surface slightly pruinose and tinged with flesh color; the yellowish mycelium or subiculum penetrating the matrix.

Decaying wood. Oneida. H. A. Warne.

This species is remarkable for the peculiar character of the pores which form little cells or cavities instead of tubes, so that in whatever direction the mass is cut or broken, the section appears equally porous. Perhaps this character will necessitate the formation of a new genus.

Notes. This plant was originally placed in the genus Polyporus but was later transferred to Myriadoporus, a genus erected by Peck to receive what are now believed to be abnormal forms of other species, differing from well-developed specimens in having a cellular, hymenial surface that is usually sterile. In such specimens both vertical and cross sections of the hymenial region show distinct pores or cavities.

The writer does not believe that the present species deserves specific rank because of its apparent abnormality. But the absence of a hymenium is more or less of a barrier to deciding of what species it is an abnormal form. Nevertheless, others may not agree with the writer, and hence a description is here appended, based entirely on the type collection.

There are mounted on the type sheet at Albany five small specimens of the fungus, the largest of which is only about 3 cm long. The specimens are annual and belong to the white group of Poria (plate 6, figure 6). At present the hymenial surface is avellaneous or vinaceous buff or verging toward pinkish cinnamon. The margin is abrupt, rather thick, and nearly or entirely fertile. The thickness of the hymenium-producing portion is 3 to 6 mm, of which the subiculum is a rather thin and inconspicuous part. The cellular hymenium is 2 to 5 mm thick, but the tubes are not continuous in any one direction. At whatever angle the hymenium is cut they appear as small rounded holes, averaging 5 or 6 to a millimeter (plate 7, figure 3).

The type material is sterile, and for the most part does not contain either basidia, cystidia or paraphyses (plate 7, figures 1 and 2). The trama is very compact and made up of thick-walled hyphae which in cross section give a firm pseudo-parenchymatous appearance to the trama (plate 7, figure 2). When teased out the hyphae are seen to be hyaline, mostly simple, and with few apparent cross walls. Their thickness is 5 to 7.5 μ, and the walls are often as much as 2 μ thick (plate 6, figure 7).

As stated above, the affinities of this plant are in doubt and it is a question whether or not such undoubted abnormal forms are worth consideration. It might be pointed out, however, that Fomes connatus has the same type of trama with smaller heavy walled hyphae as in this plant, as has also the plant heretofore referred by the writer to Polyporus rigidus Lev. A technical description is omitted.

Poria laetifica (Peck) Sacc.

Plate 7, figures 4, 6; plate 8, figures 1–2

Syll. Fung. 6: 300. 1888.

Polyporus (Physisporus) laetificus Peck, 38th Rep't N. Y. State Mus., p. 91. 1885.

Original description. Effused, thin, tender, not readily separable from the matrix, bright orange with a subtomentose yellowish margin; tubes short, often oblique, minute, subrotund, the dissepiments thick, obtuse.

Decaying wood. South Ballston. Aug.

The fungus forms patches 2 or 3 in. long, following the inequalities of the surface. In the dried state the pores appear like little ruptured vesicles as in P. vesiculosus B. & C. The species appears to approach P. fulgens, Rost.; which has the margin white fibrillose and the pores acute.

Notes. From the standpoint of the type collection this is one of the most unsatisfactory of Peck's species of Poria. Not only is the type material scanty but it is also sterile. It is therefore almost impossible to match collections with the type with absolute certainty. Consequently others may not agree with the writer in the application of Peck's name. But the writer has in his herbarium three collections from Pennsylvania that appear to agree in all respects with the type fragments. Notes were made on these in the fresh condition and these notes agree with Peck's brief description. The dried plants have a peculiar appearance to the hymenium and that also is found on my specimens. Consequently I have taken my specimens as representative of the species. Specimens have been deposited in the state herbarium at Albany and so are available for comparison with the types. These specimens are fertile as noted below. But in order to differentiate sharply between the type collection and my own specimens the following notes *are based* on *the former only* and the technical description at the end includes additional notes from my own collections.

The type collection was at first apparently on three pieces of wood, one of which was broken into three parts and mounted on a herbarium sheet (plate 8, figure 1), while the two remaining pieces were preserved in a paper packet. The largest piece of wood is about 7 cm long and 3 cm wide and about two-thirds of its area is occupied by the fungus. The color of the hymenial surface was at first bright orange (fide Peck), but on drying has become nearly hazel or cocoa brown, and another part (probably bruised when fresh) has become seal brown or aniline black. These areas are partly surrounded by a sterile, appressed-tomentose margin now cinnamon buff in color. The hymenium-producing region is less than one-half of a millimeter thick. Of this thickness nearly all is composed of tube length. From the consistency of the fructification one would not judge that the species is perennial. The fungus grew obliquely, however, and in sections taken across the tubes (hence perpendicular to the substratum) there are present many tubes (cut in cross section) completely filled with mycelium, while the ones toward the outside are free from mycelium as though they were the product of the current season's growth. Where best developed the pores average 4 to 6 to a millimeter and are subrotund with rather thick walls. Over most of the surface, however, they have an abnormal appearance "like little ruptured vesicles," as Peck states. There is no sheen or silkiness to the hymenium.

Sections of the hymenium where best developed show no spores although the basidia are present (plate 8, figure 2). No cystidia were found. The trama and the subiculum are quite compact and composed of branched hyphae very frequently more or less encrusted with small crystals (plate 7, figure 5). At present most of these hyphae are colorless but the tips are frequently filled with a brown substance which in the hymenium probably gives color to the fructification. The hyphae are 2 to 4 μ in diameter. Cross walls are visible but usually not conspicuous and often are obscured by the crystals. No clamp connections are present.

The type collection was taken from the well-decayed wood of a coniferous tree but the wood fragments adhering to the specimens are too much decayed to admit of its further identification.

The type locality is South Ballston, N. Y.

In the following description notes from recent Pennsylvania collections are also included, consequently the description is the writer's interpretation of Poria laetifica. Specimens of these collections have been deposited in the herbarium at Albany for reference.

Redescription. Widely effused, annual, separable, as much as 10 cm broad and long, 1 to 3 mm thick in fresh specimens, 1 to 2 mm thick when dry, surrounded by a warm buff to ochraceous buff, sterile, compactly tomentose margin; subiculum thin but conspicuous even in dried plants, light colored; tubes .5 to 1.5 mm long when fresh, not more than 1 mm long when dry, their mouths orange buff to ochraceous orange when fresh, dark red or blood red where bruised, orange cinnamon to hazel or often seal brown when dry, subrounded, averaging 4 to 6 to a millimeter when fresh but in dried specimens often collapsing and nearly invisible, the dissepiments rather thick walled and entire; spores allantoid, hyaline, 3.5 to 4.5 x 1 μ; cystidia none; trama and subiculum compact, of thin-walled hyphae that are colorless except for the tips that are frequently filled with a brownish substance, branched, 2 to 4 μ in diameter, often sparingly encrusted with small crystals; cross walls present but not conspicuous; clamp connections lacking.

On rotten wood both of deciduous and of coniferous trees.

Type locality: South Ballston, N. Y. C. H. Peck. Also collected at Wright's Gap, Center co., Pa., on hemlock wood, September 12, 1916; at Musser's Gap, Center co., Pa., on dead wood. L. O. Overholts, no. 3431 and no. 2944 respectively.

Poria macouni (Peck)

Plate 8, figures 3–6

Polyporus macouni Peck, Bot. Gaz., 4: 169. 1879.

Original description. Effused, irregularly tuberculate, tawny-ferruginous; pores minute, subrotund, somewhat unequal, the dissepiments generally thick and obtuse; spores subglobose, .00025 of an inch in diameter.

Creeping over and encrusting mosses. Belleville, Ontario. Macoun.

The species belongs to the section *Resupinati.* The specimens indicate that the plant is composed of numerous small unequal and irregular confluent tubercular masses whose porous surface gives them a somewhat spongy appearance. The irregular and uneven surface of the whole mass is probably due mainly to the character of the place of growth.

Notes. The original packet is now preserved in a herbarium box at Albany. It contains a single specimen that measures 7 cm long by about 3 cm broad, a photograph of which is reproduced on plate 8, figure 3. The fungus presents a very rough and undulating surface as though an attempt had been made to form numerous small pilei. The lower side of these nodules bears the nearly vertical pores. These, then, are not continuous over the surface but collected in small groups. The uneven appearance of the fructification may be mostly due to the fact that it is growing over mosses, and some moss fragments can be seen embedded in it. The thickness of the fructification is from 2 to 4 mm. There is a distinct brown subiculum from which the nodules arise. The tubes are 1.5 to 2.5 mm. long where best developed. Their mouths are rounded and rather small, averaging about 4 or 5 to a millimeter. The dissepiments are thick and entire. There is no sheen or silkiness to the hymenium.

The spores are oblong-ellipsoidal or oblong, hyaline, and measure 4.5 to 5.5 by 2 to 2.5 μ (plate 8, figure 5). Setae are abundant and project conspicuously into the lumen of the tube. They are sharp pointed and dark brown in color (plate 8, figure 6). The hyphae of which the subiculum and the trama are composed are dark brown in color and for the most part unbranched. A few cross walls are present but they are inconspicuous and are easily overlooked. There are no clamp connections on these hyphae. Their diameter varies from 2.5 to 3.5 μ (plate 8, figure 4).

A careful perusal of the above facts suggests that the species may not be distantly related to the plant known in this country as Poria ferruginosa (Schrad.) Fries, and the writer is of the opinion that this connection will eventually be established. The unusual habitat and the consequent irregularities of growth are the only separating characters. The shape of the spores is characteristic of that species. In fact the writer is unacquainted with any other species of Poria or Polyporus that has spores of this shape and size. The characters of hyphae and setae also agree with that species. P. macouni is not listed by Murrill in the North American Flora where the brown species of Poria are described.

Redescription. Subiculum effused for several centimeters, the pores collected into vertical groups forming nodules — hence surface of fructification very uneven; general coloration brown; tubes 1.5 to 2.5 mm long, their mouths rounded, ochraceous tawny to tawny, averaging 4 to 5 to a millimeter; dissepiments thick and entire; spores oblong-ellipsoidal or oblong, hyaline, 4.5 to 5.5 x 2 to 2.5 μ; setae abundant, sharp-pointed, projecting conspicuously; hyphae of trama and subiculum brown, nearly simple, 2.5 to 3.5 μ in diameter, cross walls present but indistinct; no clamp connections.

Overrunning moss.

Type locality: Belleville, Ontario, Canada. Macoun. Not otherwise known to the writer.

Poria marginella (Peck) Sacc.

Plate 9

Syll. Fung. 9: 194. 1891.

Polyporus marginellus Peck, 42d Rep't N. Y. State Mus., p. 122. 1889 (Bot. Rep't, p. 26).

Original description. Resupinate, effused, forming extensive patches, 1 to 3 lines thick; subiculum distinct, firm, subcinnamon, the extreme growing margin white, becoming dark-ferruginous with age; pores at first short, sunk in the tomentum of the subiculum, then longer, minute, rotund, often oblique, brownish-ferruginous, glaucous within, the dissepiments thick, obtuse.

Dead bark and decorticated trunks of spruce, Abies nigra. North Elba. Sept.

Remarkable for and very distinct by the narrow downy white margin that borders the growing plant.

Notes. The type collection consists of two small pieces 5 to 7 cm square, mounted on a herbarium sheet, and several others preserved in a herbarium packet. Fortunately also, several other good collections from different points in the United States are available for comparison. The color of the hymenial surface is near snuff brown, cinnamon brown, or more tawny, and the margin itself is white in fresh plants but may become brown in herbarium specimens. This margin is compactly tomentose, narrowly sterile, and quite thin. The thickness of the hymenium-producing portion varies from 1 to 5 mm, the larger thickness sometimes involving the growth of two years, although for the most part the fungus is strictly annual. The subiculum is conspicuous, bright tawny in color and at times as much as a millimeter thick. The tubes are usually rather oblique and in length may reach as much as 4 mm although more often they are not more than 2 or 3 mm long. Their mouths are more or less rounded or somewhat irregular and average 4 to 5 to a millimeter. The dissepiments are about as thick as the diameter of the tubes, and are even and entire. There is no sheen or silkiness to the hymenium.

Murrill (North America Flora, 9: 5. 1907) reported the spores of this species as "ovoid, hyaline, 6 x 5 μ." Examination of the type material shows, however, that they are allantoid, hyaline, quite small, 3 to 5 μ long and about 1 μ broad (plate 9, figure 5). These spores are found abundantly in sections, and many of them were seen attached to basidia, so there can be no question as to their identity. The same type of spore has been found in several other collections of this species. Many setae are present in the hymenium, but they do not project so prominently as in many other species (plate 9, figures 2–3). In crushed preparations (plate 9, figure 4) they are seen as the enlarged, blunt-pointed, dark-brown ends of ordinary hyphae, but they are quite different from the very large setaelike bodies of Poria setigera and Polyporus glomeratus. Their diameter is only 3 to 5 μ. The hyphae of the trama and subiculum are dark brown, rather heavy walled, and sparingly branched (plate 9, figure 6). Cross walls are faintly visible in the darker colored of these and more conspicuous in those of lighter color. There are no clamp connections on these hyphae. Their diameters are from 2.5 to 5 μ.

The type material is from dead wood of spruce and that substratum appears to be the usual one in the eastern United States. In the northwestern United States it occurs on Abies and on Larix.

The species belongs in the same group as Poria ferruginosa Fr., Poria contigua (Pers.) Fries, and Poria inermis. From the first two it differs in the smaller spores and from the last in the presence of setae and in the hyaline spores. In fresh specimens the light-colored margin is often distinctive.

Redescription. Annual or rarely perennial, brown, inseparable (?), effused for several centimeters, with a narrow, thin, sterile, tomentose border of light color in fresh plants; subiculum conspicuous, bright tawny, up to 1 mm thick; tubes oblique, 2 to 4 mm long, their mouths snuff brown, cinnamon brown, or slightly grayish, rounded, averaging 4 to 5 to a millimeter; dissepiments relatively thick, entire; spores allantoid, hyaline, 3 to 5 x 1 μ; setae abundant, not conspicuous, projecting, blunt-pointed, 3 to 5 μ in diameter; hyphae dark brown, heavy walled, nearly simple, 3 to 5 μ in diameter, cross walls visible; no clamp connections.

On wood and bark of spruce. Also on Abies and Larix from the northwest (Weir).

Type locality, North Elba, N. Y. C. H. Peck. Also known from the northwestern United States (Weir).

Poria mutans Peck

Plate 10, figures. 1–4

. 43d Rep't N. Y. State Mus., p. 39. 1890.

Polyporus mutans Peck, 41st Rep't N. Y. State Mus., p. 77. 1888.

Original description. Resupinate, rather thick, tough, following the inequalities of the wood; pores minute, rotund, short, buff-yellow or cream color, becoming dingy red or dull incarnate where wounded, the subiculum fibrous, changing color like the pores, the whole plant assuming an incarnate hue when dried.

Decaying wood of deciduous trees. Selkirk. August.

Sometimes a narrow, reflexed obtuse margin of a yellowish brown color is formed. The pores are often oblique. The species appears to be quite distinct by reason of its peculiar colors.

Notes. The type collection contains abundant material but the species is one that changes much in drying and consequently it must be carefully interpreted. The material is in pieces up to 4 cm long and broad (plate 10, figure 1). The chief characteristics of the dried specimens are the hard, almost bony consistency and the dull rusty color. The color of the hymenium is now light pinkish cinnamon in some specimens, and tawny or russet in others, and therefore with less red than in P. laetifica, although the colors of the fresh plant must be similar to those of that species, judging from Peck's descriptions. Only in the younger specimens is there a rather thick sterile and often more or less abrupt margin present; in mature specimens the margin is fertile. The thickness of the hymenium-producing portion is at present 1 to 5 mm and probably in fresh plants somewhat thicker. The subiculum is quite conspicuous and its thickness sometimes equals the length of the tubes, but is often considerably less. The tubes vary in length from 1 to 3 mm in the type. In a collection from Bolton, N. Y., they are as much as 5 mm long. Their mouths are angular in mature plants but rounded in young specimens. According to Peck their color is buff yellow or cream yellow in fresh specimens and becoming red when wounded. Their diameter is 3 to 4 to a millimeter where mature, and the dissepiments are rather thin but entire. There is no sheen or silkiness to the hymenium.

The spores are broadly ellipsoidal or nearly globose, but some are apiculate at one end and inclined to ovoid (plate 10, figure 2). They are hyaline under the microscope and 3.5 to 5 μ long by 2 to 3.5 μ broad. The best developed portions of the hymenium in the type collection are sterile and where spores were obtained it was difficult to prove their connection with the basidia; indeed mature spores attached to the basidia were not seen. But a large number of basidia have small subglobose, immature spores on sterigmata and undoubtedly the larger spores of the same general shape belong to the fungus. Moreover, in another collection of the same species made at Croghan, N. Y., by Peck, mature spores are found on basidia of the usual type. It was at first suspected that the spores of this species would be allantoid, as are those of closely related plants. There are no cystidia in the hymenium (plate 10, figure 4). The trama and subiculum are made up of very compact hyphae that are colorless, and 2.5 to 4 μ in diameter. Of these some are encrusted and some smooth, the latter type occurring in greater numbers in the growing margin (plate 10, figure 3). Cross walls are present but not conspicuous and their rarity suggests that many are invisible by the methods used for their detection. Clamp connections are present but not at all common. Both clamp connections and cross walls are more or less obscured in the encrusted hyphae. Branches are infrequently seen.

The species is related to Poria laetifica and in fresh condition this resemblance must be considerably heightened. Both are of the same general color when fresh, and both become red where bruised and on drying. P. mutans is of harder consistency when dry and has very different spores. The colors on drying are quite distinct — so much so that the species can easily be separated on that character provided it proves to be constant over a wide range of specimens.

Redescription. Effused for several centimeters, annual, apparently separable, with an abrupt sterile margin when young, later the margin sometimes entirely fertile, drying hard and firm; subiculum present, distinct, rarely as much as 2 mm thick and usually much thinner; tubes 1 to 5 mm long, their mouths buff yellow or cream yellow (fide Peck) when fresh, red where bruised, pinkish cinnamon to tawny or russet in herbarium specimens, angular, thin-walled, entire, averaging 3 to 4 to a millimeter; spores ellipsoidal or nearly globose, sometimes ovoid, hyaline, 3.5 to 5 x 2.5 to 3.5 μ; cystidia none; tramal and subiculum hyphae very compact, hyaline, many encrusted with rather large crystals, some entirely unencrusted, very sparingly branched, 2.5 to 4 μ in diameter; cross walls not frequently seen; clamp connections present but rather rare.

On chestnut wood. Probably on wood of other kinds of deciduous trees.

Type locality: Selkirk, N. Y. C. H. Peck. Also at Croghan, Bolton and Savannah, N. Y. C. H. Peck. Not otherwise known to the writer.

Poria mutans var. **tenuis** Peck

Plate 10, figure 5; plate 11, figures 1–4

43d Rep't N. Y. State Mus., p. 39. 1890.

Original description. Very thin, tender, the margin often wide and downy. Bark and wood of spruce, Picea nigra. Sevey. July.

The species appears to differ from P. cruentata Mont. in having the pores and subiculum of one uniform yellowish or subochraceous color, which changes where bruised or in drying to a dull red or subincarnate hue.

Notes. This, originally described as a variety of the former species (Poria mutans), should in all probability be regarded as distinct for reasons brought out in the following discussion. The writer hesitates to give it specific rank at present, however, as it is not certain that the spores have been found. The name is preoccupied by P. tenuis Schw. and P. tenuis Karst. Consequently if this plant be raised to specific rank it must have a new name.

Apparently the type collection well represents the species in external form and appearance. The largest specimen is scattered over a piece of wood 12 cm long and 5 cm broad (plate 10, figure 5). The color of the fructification in young specimens is now onion-skin pink or vinaceous cinnamon, and in older specimens near burned umber or carob brown but with somewhat more red than in those colors. The plant evidently develops by forming an extensive subiculum on which the tubes are later produced. Consequently the hymenium-producing portion is usually surrounded by a broad sterile margin, at present vinaceous cinnamon in color. Perhaps if collected later in the season this might largely have disappeared. This margin is finely and compactly tomentose, and may be as much as a centimeter broad. It is rather thin and not at all fimbriate. The thickness of the hymenium-producing portion is not more than one-half of a millimeter and consists of very short tubes seated on a very thin but quite evident subiculum. The mouths of the tubes are decidedly angular in outline and average

3 to 4 to a millimeter. The walls of the tubes are very thin but entire. There is no sheen or silkiness to the hymenium.

Spores have not certainly been found in the type collection. One preparation yielded a few cylindric spores that were colorless and measure 4 to 5 μ in length and about 1 μ in breadth (plate 11, figure 2). Most collections of Poria in this section, in the writer's herbarium have this type of spore and it is probably the kind to be expected in this plant. There are no cystidia in the hymenium (plate 11, figure 1). The trama and subiculum are of quite compactly arranged hyphae that are colorless, rarely branched in the subiculum but more frequently so in the trama, and with few clamp connections. Cross walls are rarely seen except in company with the clamp connections. In the subiculum many of these hyphae are encrusted and vary in diameter from 2.5 to 5 μ (plate 11, figure 3). Those of the trama are more often unencrusted, and somewhat smaller, with a diameter of 2 to 3.5 μ (plate 11, figure 4).

The type collection differs from P. mutans in the following characteristics. It is much thinner; the colors of the dried plants are quite different; their consistency is not at all that of P. mutans; that is, not hard and bony on drying. The hymenial characters with the possible exception of the spores are the same as those of that species.

The type collection is apparently from bark and decorticated wood of spruce. The decayed wood is straw yellow in color, quite brittle and readily separates into concentric layers. One specimen shows advanced stages of a pocket or piped type of decay but another organism may be responsible for it.

Redescription. Annual, separable, effused for 10 to 12 cm or more, with a compactly tomentose, sterile margin 1 cm or more broad, vinaceous cinnamon in color; subiculum quite thin but conspicuous under a lens; tubes scarcely .5 mm long, their mouths yellowish or subochraceous when fresh (fide Peck), vinaceous cinnamon, onion-skin pink, or much darker (near burnt umber or carob brown) in dried plants, angular, thin-walled, entire, averaging 3 to 4 to a millimeter; spores not definitely known, probably cylindric or allantoid, hyaline, 4 to 5 x 1 μ; cystidia none; trama and subiculum compact, of hyaline, thin-walled, simple or slightly branched hyphae, often heavily encrusted in the subiculum, but less so in the trama, 2.5 to 5 μ in the former, 2 to 3.5 μ in the latter; cross walls mostly inconspicuous; clamp connections present but not abundant.

On bark and decorticated wood of spruce.

Type locality: Sevey, N. Y. C. H. Peck. Not otherwise known to the writer.

Poria myceliosa Peck

Plate 10, figure 5, plate 11

N. Y. State Mus. Bul. 54, p. 952. 1902

Original description. Subiculum membranaceous, separable from the matrix, connected with white branching strands of mycelium which permeate the soft decayed wood, or with radiating ribs which run through the broad sterile fimbriate white margin; pores very short, subrotund angular or subflexuous, the dissepiments thin, acute, dentate or slightly lacerate, pale yellow; spores minute, subglobose, .0008–.00012 of an inch broad. Round Lake, Saratoga co. August.

This fungus forms patches several inches in extent on much decayed wood of hemlock. It follows the inequalities of the surface on which it grows. It is scarcely more than half a line thick. The pores develop from the center toward the margin and at first are mere concavities in the subiculum. The species is apparently related to P. tenuis Schw., from which it differs in habitat, color and the prominent mycelial strands. In this last character it bears some resemblance to P. vaillantii (DC) Fr.

Notes. The type collection contains abundant material in various stages of development. The largest specimen is about 8 cm broad and 12 cm long, and the smallest about 2 cm in diameter. The color of the hymenial surface is now nearly cinnamon buff in the more mature specimens and a lighter color near pinkish buff in younger specimens. The species grows widely effused and has a white or whitish sterile border that varies in width up to 15 mm. This border is characteristically fimbriate and from it strands of white mycelium sometimes radiate outward and downward into the substratum (plate 12, figure 1). The largest of these strands are about half a millimeter in diameter but those on the surface of the substratum are much smaller and in some specimens they are entirely lacking. The thickness of the hymenium-producing portion is usually less than one-half of a millimeter and never reaches a millimeter. Of this thickness practically all represents the length of the tubes, as the subiculum on these portions is extremely thin but quite conspicuous. The mouths of the tubes are decidedly angular in outline and vary in diameter from 1 to 4 to a millimeter.

The best formed ones average about 3 to a millimeter, but apparently several adjacent tubes may unite into a single cavity which in extreme instances may be as much as 1 mm in diameter, or it may be elongated or somewhat sinuous. The walls of the dissepiments are thin and in some specimens decidedly dentate, but usually not markedly so. There is no sheen or silkiness to the hymenium.

The spores are hardly subglobose as described by Peck, but are considerably longer in one direction than the other, and the writer would call them ellipsoidal. When viewed obliquely or from the end they present a nearly globose appearance (plate 12, figure 4). Their dimensions are quite small with a length of 2.5 to 4 μ and a breadth of 2 to 2.5 μ. They are colorless and smooth-walled. The basidia are also quite small, not at all prominent, and not more than 2.5 μ in diameter. There are no cystidia (plate 12, figure 2). The hyphae of the trama are loosely arranged so that thin free-hand sections present a very open structure. These hyphae are colorless, 2 to 3.5 μ in diameter, and frequently branched, the longitudinal axis of the branch always being at nearly right angles to that of the hyphae from which it is produced. All branches originate near cross walls (plate 12, figure 3) and the first cell of the lateral branch is rather short, rarely 10 μ long; a cross wall with a clamp connection is then produced and the next cell is much longer. Clamp connections are quite abundant. In the subiculum the hyphae are more irregular and, especially on the growing margin, coalescing strands of all sizes are seen to be forming the larger mycelial cords visible on those portions of the fructification.

According to the original description reproduced above, the type collection was taken from hemlock wood at Round Lake, Saratoga co., N. Y. August 21, 1900. But the label on the sheet containing the herbarium specimens gives the locality as Floodwood, N. Y. Dr H. D. House, the present State Botanist of New York, has noticed this discrepancy and has attached the following typewritten note to the sheet.

"The type locality of Poria myceliosa Peck as given in Mus. Bul. 54, p. 952–53. 1902 (viz, Round Lake, Saratoga co.) is not correct. Doctor Peck's private notes show that the species was collected at Floodwood on August 31, 1900, and his notes of that date contain the preliminary draft of the description of Poria myceliosa."

The species is rather closely related to Poria fimbriatella Peck, which differs conspicuously in the presence of distinct encrusted cystidia in the hymenium and in the absence of cross walls and clamp connections on the hyphae. That species also has the small ellipsoidal spores and rhizomorphic strands of Poria myceliosa. One collection made on August 17th, at Floodwood, N. Y., by Peck and referred by him to Poria fimbriatella belongs to the species under discussion, as does also a collection from the Catskill mountains labeled by him as Polyporus vaillantii. Both of these may have been prior collections, but the absence from the data of the year of collection obscures this point. A specimen has recently been received from E. T. Harper, collected on hemlock wood at Frankfort, Mich., August 1908.

The characteristic features of the species appear to be the thin separable growth with short tubes and rhizomorphic strands, and the small spores. The writer's interpretation of Poria vaillantii (DC.) Fries, calls for a similar plant, but one that is pure white in color, and with quite different spores.

The collections so far examined have been from very rotten wood and no definite statements can be made regarding the nature of the decay produced by the fungus.

Redescription. Effused, 2 to 12 cm broad, separable, with a broad, white, sterile, fimbriate margin often ending in small rhizomorphic strands that follow the surface of the substratum or become embedded in it; subiculum exceedingly thin, white, scarcely discernible in mature specimens; tubes scarcely .5 mm long and often considerably shorter, first appearing as shallow depressions in the subiculum, their mouths pale yellow when fresh (fide Peck), becoming pinkish buff to cinnamon buff in herbarium specimens, angular, thin-walled, often dentate, averaging about 3 to a millimeter but occasionally more or less confluent and up to 1 mm in diameter; spores ellipsoidal, smooth, hyaline, minute, 2.5 to 4 x 2 μ; basidia, 2 to 3 μ in diameter; cystidia none; tramal tissue rather open, composed of thin-walled, colorless, branched hyphae, 2 to 3.5 μ in diameter, the branching more or less right angled; clamp connections abundant.

On well-rotted hemlock wood.

Type locality: Floodwood, N. Y. C. H. Peck. Also known from Michigan.

Poria odora (Peck) Sacc.

Plate 13

Syll. Fung. 6: 294. 1888

Polyporus (Physisporus) odorus Peck, 38th Rep't N. Y. State Mus., p. 92. 1885

Original description. Effused, 2 to 3 lines thick, even, firm but brittle, moist, separable from the matrix, white sometimes stained with reddish yellow on the abrupt, rather thick, slightly fimbriate margin; pores very minute, rather long, equal, entire, white, arising from a thin but distinct subiculum; odor strong, disagreeable.

Under surface of decorticated prostrate trunks of spruce. Osceola. Aug.

It forms patches several inches broad and sometimes more than a foot long. It is distinguished from P. vulgaris by being separable from the matrix, moist, having longer pores and a strong odor. From the next following species [Poria subacida (Peck) Sacc.] it may be known by its smaller pores, more brittle texture and its different odor.

Notes. The type collection consists of four fragments mounted on a herbarium sheet and several specimens preserved in a paper packet. The largest specimen is 6 cm long and about 3 cm broad (plate 13, figure 1). The specimens are very rigid and firm and apparently become considerably colored on drying. According to Peck the fresh specimens are white with sometimes a stain of reddish yellow on the margin. At present the color varies from avellaneous to cinnamon buff or clay color, and suffused with a gray pruinosity. The plants probably become the darker of these colors when bruised.

The margin is rather abruptly sterile and still retains a reddish yellow color in most cases. In some specimens it almost entirely disappears. The thickness of the hymenium-producing portion is from 2 to 5 mm. The subiculum is rather conspicuous but scarcely more than one-fourth of a millimeter thick, and white in color. The tubes are 2 to 4 mm long and their mouths are more or less angular and covered with a grayish bloom. They vary in diameter from 5 to 7 to a millimeter. The walls are rather thick and entire. There is no sheen or silkiness to the hymenium.

The spores are allantoid or cylindric, hyaline, 3 to 4 μ long by about 1 μ broad (plate 13, figure 3). The basidia are quite small, usually not more than 2 μ in diameter. There are no cystidia or other sterile structures in the hymenium (plate 13, figure 4). The trama is very compact and in section gives an appearance approaching that of the trama of Fomes connatus, but with the walls of the hyphae not quite so thick and the appearance not quite so much like that of a pseudo-parenchyma. The hyphae are flexuous, nearly simple, hyaline, and without clamp connections. Apparently cross walls are lacking (plate 13, figure 2). Their diameter in the subiculum is 3 to 7 μ, but in the trama they are sometimes slightly smaller, 2 to 5 μ in diameter. Small isolated roughened areas are frequent on these hyphae. These areas are not encrusted with crystals but the roughening is apparently due to a breaking and scaling of the hyphal walls.

According to Doctor Peck the species has a strong disagreeable odor in fresh plants. This has not persisted in the herbarium specimens.

The nature of the decay produced can not be determined from the type collection, as no fragments of the substratum are attached to the specimens.

The affinities of the species are in doubt. The combination of characters presented is quite unlike that found in other species of Poria. The plants bear some resemblance to Poria subacida, but are easily distinguished by the much smaller tubes and the much different spores. It also bears resemblance to Poria ornatus but the pores are smaller and the spores different. Specimens previously referred by the writer to Polyporus zonalis as the temperate region form of that tropical or subtropical species agree very closely in general appearances with this species. The spores, however, are decidedly different.

It might be mentioned in this connection that several examinations of the type specimens were necessary before spores were obtained. As is often the case in resupinate specimens, the best developed parts of the hymenium showed no spores and in fact no hymenial structure of any sort. It was only when examination was made of those tubes nearer the margin that spores were obtained and the hymenium was found to be well developed.

Apparently the chief characteristics of the species are the allantoid spores, the gray pruinosity on the hymenium, the compact trama and the large hyphae. I have seen no other collections of this species and more study is necessary to decide as to whether or not certain factors should be regarded as of specific importance. The dried specimens are not fragile but are quite firm and hard.

Redescription. Effused for perhaps 10 cm or more (fide Peck) with an abrupt, narrow, sterile, reddish yellow margin; subiculum conspicuous but thin, white, persisting in dried specimens; tubes 2 to 4 mm long, their mouths white (fide Peck), more or less cinnamon buff or clay color in herbarium specimens, suffused with a grayish pruinosity easily rubbed off when fresh, angular, rather thick-walled, entire, averaging 5 to 7 to a millimeter; spores allantoid or cylindric, hyaline, 3 to 4 x 1 μ; basidia 2 μ in diameter; cystidia none; trama very compact, composed of flexuous, nearly simple, hyaline hyphae, 3 to 7 μ in diameter, apparently without cross walls; no clamp connections.

On decorticated trunks of spruce.

Type locality: Osceola, N. Y. C. H. Peck. Not otherwise known to the writer.

Poria ornata (Peck) Sacc.

Plate 14

Syll. Fung., 6: 322. 1888

Polyporus (Physisporus) ornatus Peck, 38th Rep't N. Y. State Mus., p. 92. 1885

Original description. Effused, 1 to 2 lines thick, somewhat tenacious, adnate or inseparable from the matrix, white, the surface slightly undulate or uneven, the margin definite, studded with drops of moisture when fresh, spotted with dotlike depressions when dry; pores subrotund, minute unequal, often oblique.

Decaying prostrate trunks of deciduous trees. Osceola. August.

This species is at once distinguished by its adnate subiculum and its peculiarly spotted margin. The spots are watery white in the fresh state and each one is covered by a drop of moisture. In the dried plant the place previously occupied by the drop of moisture becomes a small depression in the subiculum.

Notes. The type collection contains but a moderate amount of material at present, but apparently enough to exhibit the important characteristics of the species. The largest and best developed specimen is only about 10 cm long and 5 cm broad, but the fungus probably occurs more widely effused. Peck describes it as "adnate or inseparable from the matrix" but inspection of the lower surface of the plants shows a smooth surface where it has been in contact with the substratum. In this respect it has the appearance of Poria subacida when growing on a smooth surface, and that species under such conditions is separable. The hymenial surface is now pinkish buff to pinkish cinnamon in color. At first the plant has a rather thick margin that is sterile for a width of 3 to 4 mm, but toward maturity this becomes narrower and in the largest specimen is only 1 to 2 mm wide. This margin is marked with scattered small, subrounded, depressed spots that vary in size from one-half of a millimeter to a millimeter in diameter. These spots are not conspicuous but are quite evident under a lens. According to Peck, they represent areas previously occupied by small drops of moisture. This type of spotting is not unknown in other fungi and the exudation of drops of moisture has been characterized as a "weeping" habit. Extended observations are necessary before we can state whether or not this "weeping" is a character of specific importance. The margin of the plant is somewhat uneven but not fimbriate. Mature specimens have a total thickness that varies up to 2 mm. The subiculum is quite thin, often less than one-half of a millimeter. The tubes are often very oblique and even almost vertical where the specimens apparently grew on the vertical side of the substratum. In such cases the tubes may be as much as 6 mm in length, but under more normal conditions of growth they do not exceed 1 to 2 mm. The hymenial surface in specimens from more vertical positions is thrown into undulations as seen in the illustration (plate 14, figure 1). Such examination as it is possible to make of the type specimens indicates that this is hardly to be considered as an effort on the part of the fungus to form a pileus, but that the uneven surface of the substratum is mostly responsible for it. The mouths of the tubes are subrounded, unequal, and in vertical positions decidedly oblique. They average about 3 to 3½ to a millimeter. The dissepiments are rather thick and on the mouths of the tubes there is a fine pubescence in younger specimens, but the more mature ones are glabrous. The only lacerations are those due to the vertical growth of some specimens. There is no sheen or silkiness to the hymenium.

The spores of the species are ellipsoidal and often with a minute apiculus at one end. This apiculus when present is probably always more or less excentric in position, though certain view of the spores present it in a nearly central position. Some spores tend toward oblong-ellipsoidal in shape. They are colorless, smooth-walled, and measure 4 to 5 μ in length and 2.5 to 3.5 μ in breadth (plate 14, figure 5). Basidia are rarely seen in free-hand sections of the plant. There are no cystidia (plate 14, figure 2). At times irregular scattered crystals appear upon or in the hymenium. The tramal tissue is of fairly compact structure. The hyphae of the subiculum and the growing margin are quite large, averaging 3 to 7 μ in diameter. They are for the most part unbranched and in many the walls are very thick — similar in that respect to those of P. subacida and P. indurata. Normal clamp connections are not present on these but some of the hyphae show the characteristic forms presented in plate 14, figure 4. At "a" apparently the small outgrowth is a clamp connection, as in other species they often appear so where a hypha breaks at a cross wall. At "b" and "c" are larger bodies that still retain much of the characteristic shape of clamps and in all probability have originated from them. It would be interesting to know what developments such apparently abnormal clamps might lead to in this and other species. In the trama most of the hyphae are similar to those of the subiculum, but there are also some that are quite small, rarely more than 2.5 μ in diameter. These are considerably branched but their small size and their transparent nature makes it difficult to ascertain whether or not cross walls and clamp connections are present. In some cases they are easily detected (plate 14, figure 3) but there are many small hyphae in which they are apparently lacking.

The species is listed by Peck as growing on dead wood of deciduous trees. There is not enough of the substratum attached to the specimens to determine the host of the type collection nor the nature of the decay resulting from the presence of the fungus. But one collection of the species is preserved in the herbarium at Albany. In most respects the species resembles Poria subacida Peck, and may eventually be referred to that species. A fine specimen has recently been received from E. T. Harper, collected at Frankfort, Mich.

Redescription. Effused for several centimeters, separable from the matrix, with a narrow, sterile, nearly even, but rather thick margin 1 to 4 mm broad, marked with scattered, rounded, depressed spots; subiculum evident but rather thin, white; tubes 1 to 2 mm long, or in vertical positions 4 to 6 mm long, often very oblique, their mouths white when fresh (fide Peck), pinkish buff to pinkish cinnamon in herbarium specimens, subrounded, gaping and oblique in vertical positions, averaging 3 to 3.5 to a millimeter, the dissepiments rather thick and finely pubescent when young, glabrous when mature; spores ellipsoidal or oblong-ellipsoidal, smooth, hyaline, 3.5 to 5 x 2.5 to 3 μ, often slightly obliquely apiculate; basidia pyriform or short clavate, 3 to 5 μ in diameter; cystidia none; tramal tissue rather compact, of hyaline, thin-walled, flexuous, branched hyphae, 1 to 2.5 μ in diameter; clamp connections small and inconspicuous; subiculum hyphae mostly unbranched, 3 to 6 μ in diameter but often irregularly enlarged, with inconspicuous clamp connections.

On prostrate trunks of deciduous trees.

Type locality: Osceola, N. Y. C. H. Peck. Also found in Michigan.

Poria pinea (Peck) Sacc.

Plate 15

Syll. Fung., 9: 194. 1891

Polyporus pineus Peck, 41st Rep't N. Y. State Mus., p. 78. 1888

Original description. Resupinate, irregular from the inequalities of the matrix, rather tender but separable from the matrix, the thin subiculum and margin whitish, sometimes tinged with yellow; pores rather large, angular, unequal, two to three lines long, often oblique and lacerated, dingy whitish, becoming blackish where bruised or wounded, the whole plant becoming blackish or blackish-brown in drying.

Wood and bark of pine. Selkirk. August.

The species is apparently allied to P. obliquus, but the pores can not be described as very small, nor has our plant an "erect crested margin." It has a distinct subiculum on which the pores are formed and by reason of which the plant is separable from the matrix.

Notes. This is a peculiar species and one can not obtain an adequate idea of it from the dried specimens. The type collection contains rather abundant material but in small pieces less than 5 cm long. The species is dingy white when fresh, becoming very much darker on drying. The color of the hymenial surface at present is near fuscous or bister. Very young specimens have a whitish or yellowish sterile thin margin which may be somewhat fimbriate and in old specimens disappears entirely. It is much lighter in color than the hymenium, at least in the dried specimens. The thickness of the hymenial surface varies up to 6 mm in dried specimens, but probably the fresh specimens were somewhat thicker. The tubes are 3 to 6 mm long and for the most part oblique on the substratum. Their mouths average 1½ to 2 to a millimeter, but in drying are likely to collapse more or less and so be obscured. They are angular and the dissepiments are rather thin but entire (plate 15, figure 1). There is no sheen or silkiness to the hymenium.

The spores of this species are very unusual and unlike those of any other species of Poria. In fact, as to color, they are unlike those of any other species of pore-fungus known to the writer. Under the microscope they are more or less fuscous, not unlike those of certain of the dark-spored gill fungi. These spores are also of larger size than the writer has seen in any other species of Poria. They vary from 7.5 to 11 μ in length and 4 to 7 μ in width. In shape they are ellipsoidal to ovoid, and with smooth walls (plate 15, figure 6). Dr Burt in a recent publication (Ann. Mo. Bot. Gard., 4:360–61. 1917) gives the spore measurements for this species as 10 to 12 by 6 to 7 μ, but my measurements make them considerably shorter. There are no cystidia in the hymenium (plate 15, figure 2). The basidia in the type specimens are quite conspicuous and in free-hand sections (plate 15, figure 2) they have a tendency to separate in a smooth layer from the trama. In all cases there is a distinct line of cleavage between basidia and trama and in some cases the basidial layer has separated and curled away from the trama. This region of separation is represented in the microphotograph by a whitish line or band. Such a character has not been seen by the writer in any other species of pore fungus. It is probably correlated with the parallel arrangement of the tramal hyphae mentioned below.

The trama is made up of closely compacted hyphae in which the arrangement is more strikingly parallel than is usually the case. In some the walls have apparently collapsed and so are more or less irregular (plate 15, figure 3). Others are more definite. Cross walls are visible and quite conspicuous in some hyphae, but apparently absent in others. No clamp connections are present. The hyphae are simple or sparingly branched (plate 15, figure 4). Their diameter varies from 1 to 3 μ. In the subiculum the hyphae are more regular and slightly larger, with a diameter of 2 to 6 μ. On some of these hyphae clamp connections are present and quite conspicuous (plate 15, figure 5).

Dr Burt, in the above-mentioned paper, has listed this species as a synonym for Merulius incrassatus B. & C., and transferred that species to the genus Poria. Merulius spissus Peck is also given as a synonym. Poria pinea is undoubtedly a Poria. In oblique situations the tubes of Peck's types sometimes reach a length of 6 mm, while Dr Burt reports them as up to 3 mm in length. The colors given by Dr Burt are probably based on the Berkeley and Curtis types, as " mouse gray " has not enough brown, and "aniline black" has too much purple in it to represent Peck's types.

Redescription. Effused for several centimeters, annual, rather tender, separable, with a thin whitish or yellowish sterile margin when young; subiculum very thin, whitish, rather conspicuous, tubes 2 to 6 mm long, their mouths dingy whitish (fide Peck) when fresh, becoming darker where bruised or dried, fuscous or bister in herbarium specimens, angular, thin-walled but entire, averaging 1.5 to 2 to a millimeter; spores ellipsoidal or ovoid, smooth, fuscous, 7.5 to 11 x 4 to 7 μ; cystidia none; trama and subiculum compact, of thin-walled, partially collapsing and irregular hyaline hyphae with inconspicuous cross walls and clamp connections, nearly simple, 1–3 μ in diameter.

On wood and bark of pine.

Type locality: Selkirk, N. Y. C. H. Peck. Not otherwise known to the writer.

Poria radiculosa (Peck) Sacc.

Plate 16

Syll. Fung., 6: 314. 1888

Polyporus radiculosus Peck, 40th Rep't N. Y. State Mus., p. 54. 1887

Original description. Resupinate, effused, thin, soft, tender, orange-yellow, the mycelium creeping in and over the wood, silky-tomentose, at first white, then yellow, forming numerous yellow branching rootlike strings or ribs which are more or less connected by a soft silky tomentum; pores rather large, angular, at first shallow, sunk in the mycelium, the dissepiments becoming more elevated, thin and fragile; spores elliptical, .0002 to .00025 inch long, .00016 broad.

Half-buried chips of poplar. Populus tremuloides. Gansevoort, September.

The species is allied to P. vaillantii, in its peculiar rhizomorphoid strings of mycelium, but from this it differs decidedly in its color and texture. In these respects it approaches P. bombycinus, of which it may possibly be a peculiar variety. It is very destructive to the wood on which it grows, causing it to become soft, brittle and even friable.

Notes. From the standpoint of the type collection this species is the most unsatisfactory of all of Peck's Porias. Nothing as to general appearance, color etc., can be added beyond that contained in the original description. There are mounted on the type sheet at Albany six small bits of wood, four of which have only a few rhizomorphic strands of white or cream-colored mycelium. On the other two bits of wood there is perhaps a square centimeter of fruiting surface which apparently represents the marginal growth of the fructification, though on one of these bits the hymenium is well formed (plate 16, figure 1). The chief characteristics of the species appear to be the color, the rhizomorphic strands, and the oblong-ellipsoidal spores (plate 16, figure 6). The spores measure 5 to 7.5 μ in length and 2.5 to 3 μ in breadth. No cystidia are present (plate 16, figure 3). The hyphae of the subiculum and trama are rather characteristic. Many of them are quite irregular in outline and have the appearance of being much collapsed. In the subiculum they are often slightly encrusted and made up of rather short cells with a diameter of 4 to 7 μ. They are very transparent and thin-walled. Clamp connections are present but their walls are so thin and transparent that they easily escape detection. In the trama the hyphae are somewhat smaller, averaging 2 to 4 μ in diameter. Some are with cross walls and clamp connections but in others these are lacking. The hyphae are more or less branched in both the trama and the subiculum (plate 16, figure 4, 5).

In the same folder with the type collection there is another sheet on which is mounted an excellent representation of a species of Poria referred by Peck to P. radiculosa. Microscopic examination shows, however, that it is not the same plant, though somewhat similar as far as one is able to judge. There are two important differences. The spores in that collection are very short-ellipsoid or subglobose with much smaller dimensions than those in the type collection. They measure only 3 to 5 μ in length and 2 to 3.5 μ in breadth. Another difference is in the hyphae. In this collection they are exceptionally clear-cut in teased preparations as contrasted with the often irregular, ill-defined hyphae in the types. Their dimensions are 2.5 to 4.5 μ. Clamp connections and cross walls are abundant and extremely well defined as contrasted with the often indistinct walls and clamps of the types. These hyphae are frequently branched and hyphal anastomoses are common — both characteristics rare in the type collection.

If the type collection well represented the species, and if in general appearance this second collection were much like the types, the writer would nevertheless hesitate to refer it to this species on the basis of these microscopic differences alone. Since the type collection is so scanty that its general features can not be determined, it becomes still more important that great caution be used. The writer would like to take this second collection as representing the species, and probably there are those who have gained their idea of the species entirely from this collection. Under the circumstances, however, it seems inadvisable to do so. The date of collection of these second specimens can not be determined from the label. The locality is mentioned as the Catskill mountains, and the locality of the type is Gansevoort. It is possible that Peck had before him both of these collections when describing the species, but there is no evidence to this effect. It seems desirable to allow the matter to rest at this point for the present and to consider that the basis on which the species rests at present should be the original description and the very meager types.

Poria semitincta (Peck) Cooke

Plate 17

Grevillea, 14: 115. 1886

Polyporus (Resupinati) semitinctus Peck, 31st Rep't N. Y. State Mus., p. 37. 1879.

Original description. Subiculum thin, soft, cottony, separable from the matrix, whitish, more or less tinged with lilac, sometimes forming branching, creeping threads; pores very short, unequal, whitish or pale cream-colored, the dissepiments at first obtuse, then thinner, toothed on the edge.

Under surface of maple chips. Griffins. Sept.

This is a soft, delicate species, with meruloid pores, similar to those of P. violaceus. The lilac stains appear on the subiculum only.

Notes. This is the second species of Poria described by Peck. The material in the type collection is rather scanty, but the type sheet contains a second collection, and a third collection is mounted on another sheet. These other collections agree in all respects with the type collection so that a very good idea of the species can be obtained. The largest specimen is 7 cm long and not quite 2 cm broad. The other specimens are more fragmentary, but apparently the fructification is not widely effused (plate 17, figure 1). The color of the hymenial surface is now avellaneous buff to pinkish cinnamon or sometimes with a tinge of the lighter vinaceous colors of Ridgway. A fourth collection is preserved in a herbarium box and was collected from deciduous wood by Peck in 1904 at Lyndonville. This appears to be the same species, and if so is in a much better condition than any of the others. The color is pale ochraceous salmon or light pinkish cinnamon. According to Peck, the fresh specimens are whiter and with a tinge of lilac to the subiculum. Most of the specimens are broadly sterile on the margin, sometimes as much as 4 or 5 mm. This border is finely tomentose but scarcely fimbriate. On some specimens from the type locality and growing on beech leaves, a few white rhizomorphic strands are developed. They are not present where the specimens grow on wood. The thickness of the hymenium-producing portion is less than one-half of a millimeter in the dried specimens. The subiculum is extremely thin and the tubes very short, appearing scarcely more than shallow depressions in the dried specimens. The mouths of the tubes are more or less rounded but unequal in size, averaging about 3 to a millimeter. Peck states that the dissepiments are toothed on the edge. The writer would not describe them as toothed in the sense that the term is ordinarily used as applied to inequalities arising from lacerations of the dissepiments, but they are slightly uneven because one edge of the tube is slightly prolonged beyond the other. The dissepiments are rather thin but entire. There is no sheen or silkiness to the hymenium. The spores are oblong or short cylindric, hyaline, and 3 to 4 μ long by 2 μ broad (plate 17, figure 6). So far as the writer can ascertain from Peck's collections, they are never allantoid at maturity as in Poria griseoalba, but in other respects they resemble very much the spores of that species. The basidia measure 2 to 3 μ in diameter. There are no cystidia in the hymenium of most specimens (plate 17, figure 3) but in the Lyndonville collection they are sometimes present as projecting, weakly encrusted hyphae near the mouths of the tubes. The subiculum is rather open in construction, and made up of hyphae that are thin-walled, flexuous, branched, and with rather prominent cross walls that separate the filament into elongated cells (plate 17, figure 5). These are never so short as those frequently found in Poria griseoalba, but they are always many times as long as broad, though the dimensions do not appear to be very constant. In the trama the hyphae rarely reach the diameter of the larger ones of the subiculum and at times cross walls are difficult or impossible to make out (plate 17, figure 4). These hyphae vary in diameter from 3 to 7 μ, and hyphal fusions are extremely common. There are no clamp connections on the hyphae. Rarely they are very slightly encrusted with small, scattered granules but these are not noticeable except under rigid inspection. In several mounts made of the hyphae the peculiar origin of the basidia as illustrated for Poria griseoalba was not seen.

From several references already made to Poria griseoalba it may be inferred that propably Poria semitincta is most closely related to that species. Microscopically the two species are difficult to separate unless the shape of the apparently mature spores, the nature of the origin of the basidia, and the absence in the latter species of the very short hyphal cells be regarded as indicating specific difference. In the former species the mature spores are decidedly allantoid and several times longer than broad, while the only spores observed in Poria semitincta were not at all allantoid. Microscopically the two species are somewhat similar in some specimens but in others there is less resemblance. Both are quite thin and light colored when fresh, but the lilac tinge to the subiculum should facilitate their separation in the field. Poria myceliosa and Poria fimbriatella are also somewhat similar. The latter species may easily be distinguished by the presence of cystidia. The former species has shorter and smaller spores, hyphae 2.5 to 3.5 μ in diameter, and with clamp connections.

No information can be gathered from Peck's collections as to the nature of the decay produced by the fungus.

Redescription. Annual, separable, not broadly effused, with a white, tomentose, sterile margin from which a few rhizomorphic strands are rarely produced; subiculum very thin, noticeable only on the margin, white or with a tinge of lilac in fresh specimens (fide Peck); tubes less than .5 mm long, meruloid in dried specimens, whitish or pale-cream color when fresh (fide Peck), avellaneous to pinkish cinnamon in herbarium specimens, or a light vinaceous shade rarely persisting, the mouths subrounded, averaging 3 to a millimeter; dissepiments thin, entire but often uneven; spores oblong or short cylindric, hyaline, 3 to 4 x 1 to 2 μ; basidia 2 to 3 μ in diameter; cystidia none or at least very inconspicuous; trama and subiculum rather open, of loosely arranged, hyaline, flexuous, branched hyphae 4 to 7 μ in diameter; cross walls prominent; clamp connections absent.

On chips of maple (Acer) and perhaps woods of other deciduous trees; sometimes overrunning leaves.

Type locality: Griffins, N. Y. C. H. Peck. Also collected by Peck at South Bethlehem, at Ballston, and at Lyndonville.

Poria setigera Peck

Plate 18

51st Rep't N. Y. State Mus., p. 293. 1898

Original description. Effused, tough, thin, adnate, the thin sterile byssine or tomentose margin whitish; pores minute, rotund, shallow, $^1/_6$ to $^1/_7$ line wide, smoky brown, suffused with a grayish white pruinosity, the dissepiments entire, their edges and the sterile margin bearing smooth colored setae .003 to .005 in. long, .0005 to .0006 broad.

Bark of red maple, Acer rubrum. Gansevoort. July.

This fungus forms patches by confluence several inches in extent. The setae are external and do not appear to develop within the pores. Therefore the species is not a Mucronoporus.

Notes. The type collection contains an apparently fair representation of this peculiar and interesting Poria, if such it be. The fructifications are effused up to widths of 10 cm (plate 18, figure 1). The color of the hymenial surface is now drab to wood brown or fuscous, and at times suffused with a grayish pruinosity. Each fructification is surrounded by a sterile, cream buff or pinkish buff margin 1 to 4 mm broad (plate 18, figure 2). This margin is slightly pubescent and often with the small, brown, stiff, projecting setae characteristic of the hymenial region (plate 18, figure 4). The thickness of the hymenium-producing portion may be as much as 1.5 mm, of which by far the larger part is apparently the subiculum of the fungus. The tubes are less than one-half of a millimeter in length. Their mouths are more or less rounded, though at times slightly angular and average about 5 to a millimeter. The walls are fairly thick and always entire. There is no sheen or silkiness to the hymenium.

The spores are ellipsoidal or often reniform or boat-shaped, hyaline, and measure 3 to 5 μ in length and 2 to 3 μ in breadth (plate 18, figure 9). The setae are the characteristic structures of this species. They resemble exactly those recently described (Torreya, 17: 202–6. 1917) for Polyporus glomeratus Peck, by the writer. They are present both embedded in the trama and in the subiculum (plate 18, figure 3), and project prominently into the lumen of the tubes. Peck states that they are external and apparently do not develop within the tubes, but that is not the case, as can be seen in the illustration. They often project conspicuously from the bottom of the tubes, but many are entirely internal and never project at all (plate 18, figure 3). As in P. glomeratus, they are simply the enlarged pointed ends of special brown hyphae, and in crushed preparations can be traced for considerable distances. Their diameter is 10 to 20 μ. In length they often equal the length of the tubes. There are present also small setae of the usual type, between the basidia (plate 18, figure 3a, 8). These are sharp pointed, and have no connection with the large embedded setae. They measure only 30 to 50 by 5 to 7 μ. The hyphae of the trama and subiculum vary considerably. In the trama and the old subiculum they are decidedly brown under the microscope and cross walls are rather abundant and easily made out. They are branched at frequent intervals and measure 2 to 4 μ in diameter (plate 18, figure 6). In the subiculum of the growing light-colored margin the hyphae are hyaline, thin-walled, and cross walls are rarely seen. These hyphae are branched, are usually quite flexuous, and the terminal branches frequently taper out to a long narrow point (plate 18, figure 7). The diameter of the larger of these hyphae is 2 to 5 μ.

The relationships and indeed perhaps even the autonomy of the species are open to question. From a study of the type collection the writer obtains no evidence that the species is not simply an unusual species of Poria, but the appearance and other characteristics are unlike those of any other species.

Redescription. Annual, effused for several centimeters, inseparable (fide Peck), with a whitish or cream buff sterile margin up to 4 mm broad and often beset with the setae described below; subiculum brown, 1.5 mm thick, much thicker than the length of the tubes; tubes very short, their mouths mostly rounded, drab to wood brown or fuscous and sometimes with a grayish pruinosity, averaging about 5 to a millimeter; dissepiments fairly thick, entire; spores ellipsoidal to reniform, hyaline, 3 to 5 x 2 to 3 μ; setae abundant, of two types: large (10 to 20 μ diameter) brown, pointed bodies in the trama, the subiculum, and projecting from the hymenial surface; small (30 to 50 x 5 to 7 μ), pointed, of usual type, between the basidia; trama and subiculum compact, of brown, branched hyphae with many and conspicuous cross walls but no clamp connections, 2 to 4 μ in diameter; marginal subiculum with hyphae hyaline, branched, no cross walls, branches often tapering to a fine point, no clamp connections, 2 to 5 μ in diameter.

On bark of red maple.

Type locality: Gansevoort, N. Y. C. H. Peck. Not otherwise known to the writer.

Poria subacida (Peck) Sacc.

Plate 19; plate 20; plate 21; figure 6

Syll. Fung., 6: 325. 1888

Polyporus (Physisporus) subacidus Peck, 38th Rep't N. Y. State Mus., p. 92–93. 1885

Original description. Effused, separable from the matrix, tenacious, flexible, uneven, determinate, the margin downy, narrow, pure white; pores small, subrotund, 1 to 3 lines long, often oblique, whitish inclining to dingy-yellowish, pale tan color or dull cream color, the dissepiments thin, more or less dentate; odor strong, subacid.

Prostrate trunks and decaying wood of various trees, hemlock, spruce, birch etc. Osceola. July.

This species is not rare, but it has probably been confused with its allies. It forms extensive patches, sometimes several feet in length. It adheres somewhat closely to the matrix, but its texture is so tough that it is generally easy to strip it from its supporting substance. It is apparently closely related to P. medullapanis, but the description of that species gives the pores as medium size and entire, and makes no mention of any odor, in consequence of which we have thought our plant distinct. It is however, extremely variable.

Var. *tenuis* is very thin, scarcely a line thick, with short pores and surface nearly even. It occurs on the smooth decorticated trunks of hemlock.

Var. *tuberculosus* has the surface more or less roughened by unequal prominent tubercules, which are either scattered or clustered. They appear to be a monstrous development of the mycelium on the surface of the pores.

Var. *stalactiticus* incrusts mosses and therefore has the surface very uneven with numerous and unequal porus protuberances. It most often occurs on prostrate mossy trunks of birches.

Var. *vesiculosus* (P. vesiculosus B. & C.) has shallow scattered pores as if formed from ruptured vescicles.

Specimens of this Polyporus, unless dried under pressure, shrink and roll up in unmanageable shapes. They often contain considerable moisture when collected, and if put in press in this condition they are liable to become brown or blackish in drying. Specimens collected in a dry time or in dry situations retain their characters best. The thinner forms, if partly dried before they are put in press, sometimes retain their color and characters well. When growing on bark the patches are sometimes interrupted and irregular, in which case the margin is broader than usual and well defined.

Notes. The type collection contains four small slabs of material mounted on a herbarium sheet and as much more preserved in a herbarium packet. It represents very well the species as the writer has come to know it in the eastern United States (plate 19, figure 1). Two other sheets of specimens are contained in the same folder and there is also one small box of specimens. In another folder are the original collections representing varieties recognized by Peck. All but one are from the wood of coniferous trees, either spruce or pine. Apparently these are all the labeled collections in Peck's herbarium, though it is such a common species that a search through the undetermined material would probably yield as many more collections. Recent material collected in abundance by Weir in the northwest and referred to this species shows a considerable range of variation not exhibited by eastern collections. These western forms will be discussed separately later, as some might not agree with Doctor Weir and the writer as to their identity.

The largest specimens of the type collection are 10 cm long and about 7 cm broad. Other eastern collections sometimes show a much greater expanse of growth. The color of the hymenial surface is pinkish buff to avellaneous in herbarium specimens but fresh specimens are often white or whitish, becoming darker when bruised. Peck states that it is separable from the matrix, but this is true only when growing on a rather smooth surface. Such specimens when separated have a peculiar appearance to the contact surface, which seems more or less characteristic of such forms. When so separated and dried, specimens curl badly and become rather hard and rigid. But when growing on an uneven surface such as the bark of a tree, it is impossible to separate the fungus in entirety from the substratum.

Younger specimens have a conspicuous, sterile, tomentose margin sometimes 5 to 6 mm broad. This becomes narrower as specimens mature and in rare cases entirely disappears. Usually it persists to some extent and where the entire expanse of growth is present in specimens it is easily seen. This border is fairly even, not at all fimbriate, and is somewhat lighter in color than the hymenial surface. The thickness of the specimens of an eastern origin varies considerably, being from one-half of a millimeter to 6 mm. Based on the thinnest of such forms. Peck described the variety *tenuis* (plate 21, figure 6). Of this thickness the major part is composed of the tube lengths. The subiculum is rather thin and in mature specimens often nearly extinct. The tubes vary from one-half of a millimeter to 6 mm in length, the latter measurements sometimes attained where the tubes are in an oblique position. In well-formed specimens their lengths run from 2 to 4 mm in eastern collections. The mouths of the tubes are rounded or slightly angular, averaging 3 to a millimeter. The walls of the dissepiments are rather thin but entire. Most often there is no sheen or silkiness to the hymenium but in some few specimens considerable luster is developed.

The spores are ellipsoidal sometimes markedly oblong-ellipsoidal or ovoid, some with an oblique apiculus (plate 20, figure 7), hyaline, 4.5 to 6 μ long, and 2.5 to 3.5 μ broad. The cystidia vary considerably and the structures so referred may not be true cystidia at all. Sometimes they are scarcely more prominent than basidia and such are to be distinguished only by their pointed apex. At other times they are quite conspicuous, two or three times thicker than the basidia and with a rounded, swollen apex, or swollen toward the top but the apex itself blunt pointed. These structures are represented in the illustration, plate 20, figures 3, 4. Their size varies from 15 to 20 μ long and 5 to 7 μ in diameter at the thickest part in the larger forms. They appear to occur constantly in the type specimens and in most other collections examined. The hyphae of the trama are compactly arranged and their diameter varies from 2 to 5 μ. They are simple or only rarely branched and as far as revealed by the ordinary powers of the microscope no cross walls are present and no clamp connections. The hyphae of the subiculum are often considerably larger (4 to 7 μ) but in other respects they do not differ from those of the trama (plate 20, figures 5 and 6). Many of the hyphae from both regions have quite thick walls similar to those in the hyphae of P. indurata. Irregular crystals are usually abundant on and in the hymenium.

The affinities of the species are with such as Poria pulchella, Poria medullapanis and Poria ornata. From the last mentioned it appears to differ constantly in the much greater diameter of the hyphae, which in those two species (as interpreted by the writer) are only 1 to 3 μ in diameter and considerably branched. The hyphae of P. pulchella appear to be intermediate in diameter between those of these species. There are differences of appearance, however, hard to describe, which have so far enabled the writer to separate these two species.

The substratum is nearly always a coniferous log, though Peck himself collected it (var. *stalactiticus*) (plate 19, figure 2) on birch logs, and the writer has several collections from different deciduous hosts.

Two other varieties were described by Peck (see var. *tenuis* also above): Var. *tuberculosa* with the surface roughened by unequal prominent tubercles (plate 19, figure 4) and var. *vesiculosa* "with shallow scattered pores as if formed from ruptured vesicles" (plate 19, figure 3). All these appear to belong to the species and probably represent isolated occurrences of anomalous forms owing their existence to abnormalities of growth or affected by the nature of the substratum on which they grew.

Peck noted a strong subacid odor to fresh specimens of the species. This has not been noted by the writer and no mention is made by various careful collectors who have sent in material of the species.

Through the kindness of Dr J. R. Weir, of Missoula, Montana, the writer has had the opportunity of examining a large series of collections of a western species sent for determination. At first these were referred to P. pulchella by the writer. After examination of a larger series of specimens the writer identified certain collections with P. subacida. Further correspondence with Doctor Weir gave undoubted indications that a much larger number of the collections should be so referred, and a more recent comparison verifies the opinion. These western specimens differ from those of eastern collections in a few particulars, and in the absence of connecting forms would hardly be referred to the same species. The chief difference is in the thickness of the fructification. Specimens more than 1 cm thick are not unusual, and Doctor Weir states that specimens an inch or more in thickness are sometimes found. Such specimens are of course perennial. This condition is not much different from that often shown by P. pulchella, where some specimens are quite thin, and others 1 cm or more thick. The color is somewhat different in these forms, with more yellow in young specimens and with thicker and older specimens of a smoke gray color.

Redescription (based on eastern collections only). Annual, effused from a few centimeters to a foot or more, separable or on uneven surfaces more unseparable, with a light-colored, sterile, tomentose margin, 5 to 6 mm broad or narrower in mature specimens; subiculum thin, white, not conspicuous; tubes when well developed 2 to 4 mm long, longer in oblique positions, shorter at times, their mouths whitish or light yellow, darker when bruised and pinkish buff to avellaneous in herbarium specimens, rounded or somewhat angular in outline, averaging 3 to 3½ to a millimeter, the dissepiments rather thin but entire; spores ellipsoidal or oblong ellipsoidal, smooth, hyaline, sometimes obliquely apiculate, 4.5 to 6 x 2.5 to 4 μ; cystidia represented by small sterile organs, usually clavately thickened at apex or thickened above but with a blunt-pointed apex, 5 to 7 μ in diameter; tramal tissue of rather closely compacted hyaline hyphae, unbranched, apparently without cross walls or clamp connections, 4 to 6 μ in diameter.

On wood of coniferous trees, especially spruce; more rarely on wood of deciduous trees.

Type locality: Osceola, N. Y. C. H. Peck. Frequent in the northeastern United States and perhaps widely distributed across the northern half of the country.

Poria subiculosa (Peck) Cooke

Plate 21, figures 1–5

Grevillea, 14: 114. 1886

Polyporus (Resupinati) subiculosus Peck, 31st Rep't N. Y. State Mus., p. 37. 1879

Original description. Subiculum widely effused, dense, but soft and downy tomentose, tawny, cinnamon; pores forming patches upon the subiculum, short, unequal, sometimes slightly labyrinthiform, cinereo-ferruginous, ferruginous-brown when bruised, the dissepiments when young whitish and pruinose-villose.

Creeping over mosses, decaying wood, and even stones, in sheltered places. Copake. Oct.

The patches are several inches in extent. The pores have a paler hue than the subiculum, but they become darker when bruised.

Notes. This anomalous species is well represented on the type sheet though the material is not abundant. A second collection is preserved in a herbarium box. The largest specimen is about 9 cm long and 6 cm broad. A dense, soft subiculum is first formed over the surface of the substratum and upon this the pores later develop (plate 21, figure 1). The color of the mature hymenial surface is wood brown to cinnamon or near ochraceous tawny. In consistency even the dried plants are soft and coriaceous. A wide, sterile, subiculose margin (frequently as much as 3 cm broad) often surrounds the hymenium. The color of this is clay color to ochraceous tawny or buckthorn brown and it is extremely soft and feltlike. The thickness of the hymenium-producing portion is 2 to 4 mm, of which the subiculum sometimes represents as much as half. This latter is soft and feltlike and brown in color. The tubes are 1 to 2 mm long. Their mouths are angular, irregular or slightly daedaloid and measure 1 to 2.5 to a millimeter. The dissepiments are at maturity rather thin and entire or slightly denticulate. There is no sheen or silkiness to the hymenium.

The spores are broadly ovoid or broadly ellipsoidal to subglobose, hyaline and measure 5 to 7 by 3 to 5 μ (plate 21, figure 5). There are no cystidia (plate 21, figure 2). The hyphae are of two general sizes. Those of the sterile subiculum are the larger and are heavy-walled, brown in color and with evident cross walls and little or no branchings (plate 21, figure 4). Their diameter is 5 to 7 μ. Those of the trama are considerably smaller, 3 to 6 μ in diameter. Some of these are brown and a few are nearly or quite colorless. Branching is more frequently found in these than in the hyphae of the subiculum, and cross walls are not uncommon (plate 21, figure 3). These hyphae are more flexuous and somewhat thinner walled than those in the subiculum.

The species apparently has no near relatives that are at all common in this country. A collection has been recently received from E. T. Harper, collected on an arbor vitae log at Neebish, Michigan, October 1917. This specimen has persisted for three years, forming a new layer of tubes each year. Lloyd reports (letter no. 63, p. 16) a collection from Wisconsin by Dr C. J. Humphrey.

Redescription. Annual or reviving for two or three years, easily separating, effused for several centimeters, general color brown; consisting at first of a soft brown subiculum on which pores are developed; subiculose margin broad, sterile, feltlike, clay color to ochraceous tawny; subiculum conspicuous, brown, up to 2 mm thick, soft and floccose; tubes 1 to 2 mm long, their mouths near cinnamon or ochraceous tawny, angular to irregular or slightly daedaloid, averaging 1 to 2.5 to a millimeter, with rather thin and entire or denticulate dissepiments; spores broadly ovoid to broadly ellipsoidal or subglobose, hyaline, 5 to 7 x 3 to 5 μ; cystidia none; hyphae of margin thick-walled, brown, 5 to 7 μ in diameter, simple, cross walls rather numerous, no clamp connections; hyphae of trama more flexuous, brown or sometimes hyaline, 2.5 to 5 μ in diameter, otherwise as above.

Creeping over mosses, decayed wood, etc.

Type locality: Copake, N. Y. C. H. Peck. Also collected by Peck at Freeport, N. Y., and by E. T. Harper at Neebish, Mich.

Poria sulphurella (Peck) Sacc.

Plate 22, figures 1–5

Syll. Fung., 9: 190. 1891

Polyporus sulphurellus Peck, 42d Rep't N. Y. State Mus., p. 123 (Bot. ed., p. 27). 1889

Original description. Resupinate, effused, very thin, following the inequalities of the matrix, subiculum and margin downy, white; pores very short, minute, rotund, very pale yellow, often with a slight salmon tint, the dissepiments obtuse.

Dead bark of poplar, Catskill mountains. Sept.

Notes. The type material of this species is somewhat scanty, consisting of four small specimens on bark and mounted on a herbarium sheet. The name should not be confused with Daedalea sulphurella Peck, a resupinate species described later in this paper, and thought by Peck to have affinities with the genus Daedalea. In view of the fact that both species are resupinate it would have been better had the Daedalea species been given another name.

The largest piece of bark bearing the type specimens is about 9 cm long and 3 cm broad but less than half of its surface is covered by the fungus (plate 22, figure 1). The color of the hymenial surface is at present light buff or pinkish buff. At first the fructifications are surrounded by a narrow, very thin, sterile, pubescent border which may in part disappear as the plants mature. The thickness of the mature fruiting portion is only about three-fourths of a millimeter in the thickest parts, and in places is considerably thinner. Of this thickness the larger part is made up of tube lengths, the subiculum being very thin and nearly invisible. The mouths of the tubes are rounded and even in the most mature specimens, and average 5 to 6 to a millimeter. The dissepiments are nearly as thick as the diameter of the tubes, and except in the more mature specimens are very finely pubescent. They are very regular and entire. There is no sheen or silkiness to the hymenium.

The spores are short cylindric and for the most part curved. They are colorless and 3 to 5 μ long by 1 to 2 μ broad (plate 22, figure 5). They are not abundant in the specimens but are not hard to find both free floating and on basidia. There are no cystidia in the hymenium (plate 22, figure 2). The trama is not very compact and is composed of hyaline, thin-walled hyphae that are usually quite flexuous and more or less branched (plate 22, figure 4).

Few cross walls and clamp connections are recognizable on these hyphae. The hyphae of the sterile margin and subiculum are somewhat different, being long and straight, simple or infrequently branched, and with abundant and conspicuous clamp connections (plate 22, figure 3). Cross walls are apparent only where clamp connections are present. The diameter of both types of hyphae is quite small, up to 2.5 μ.

In general appearance the species bears some resemblance to Poria semitincta and to resupinate forms of Polyporus semipileatus Peck. But from both it differs in the much smaller diameter of the hyphae, and from the former also in the considerably smaller tubes.

Redescription. Effused for several centimeters, annual, separable (?), very thin, light of color, with a narrow, sterile pubescent, white margin at least when young; subiculum very thin and inconspicuous, white; tubes up to .75 mm in length, their mouths light buff or pinkish buff, rounded, averaging 5 to 6 to a millimeter, the dissepiments relatively thick, slightly pubescent when young, quite even and entire; spores cylindric or allantoid, hyaline, 3 to 5 x 1 to 2 μ; cystidia none; trama of loosely arranged, hyaline, thin-walled, flexuous hyphae, sometimes branched, cross walls and clamp connections not often apparent; subiculum hyphae straight, simple, with conspicuous clamp connections at the cross walls; diameter of both types 1 to 2.5 μ.

On dead bark of poplar.

Type locality: Catskill mountains, N. Y. C. H. Peck. Not otherwise known to the writer.

Daedalea sulphurella Peck

Plate 23

44th Rep't N. Y. State Mus., p. 21. 1891

Original description. Resupinate, effused or nodulose, pale sulphur-yellow; pores short, labyrinthiform, the dissepiments often lacerated and irpiciform in the dry plant; spores subglobose or broadly elliptical, .0002 in. long.

Much decayed wood. Salamanca. September.

Mostly very irregular or nodulose, following the irregularities of the wood and encrusting mosses. It is of a beautiful pale yellow color when fresh, but it changes to a dull pallid hue when dry.

Notes. This is an extremely unsatisfactory species from the standpoint of the type collection, and no other material is available. In the box of type specimens are many small bits of rotten wood some of which are covered by the fungus that for the most part one would hardly refer to the pore fungi at all. There are only a few small pieces that show the nature of the hymenium. The fragments that are mature suggest an Irpex (Hydnaceae) rather than a Daedalea, and in some specimens there project isolated rounded teeth from the substratum. The writer is inclined to believe that the fungus does not belong in this group, but since it was so described by Peck it will be presented here.

The largest fragments of fruiting bodies are scarcely more than 1 cm broad, but some fragments showing no hymenial configuration are somewhat larger. These last mentioned have the appearance of a species of Corticium (plate 23, figure 1). The color of the fungus is now pinkish buff or cinnamon buff all over, but was described by Peck as sulphur yellow in the fresh plant. The surface of the fructification is very uneven, following the inequalities of the wood. The thickness of the fungus, including the length of the teethlike projections, is not more than a millimeter, and where no teeth are present it is extremely thin. The spore-producing layer covers the surface of what appear to be platelike teeth or in some cases awl-shaped projections. These teeth are for the most part connected at the base as in Irpex, or as might happen if the dissepiments were much torn or split. The presence of isolated teeth, however, seems to favor the idea that the proper place for the species is among the Hydnaceae. The fungus was growing in part on a vertical substratum which would exaggerate the sinuous character of the hymenium.

Some parts of the fungus are mature and spores are produced in abundance. These are broadly ellipsoidal or globose, hyaline, and measure 4 to 6 μ in globose forms. The ellipsoidal spores are 5 to 6 μ long and 4 to 5 μ broad (plate 23, figure 4). Often a slight apiculus is visible, and frequently the spore contains a large hyaline oil globule that practically fills it. The basidia are 5 to 6 μ in diameter. The trama and subiculum are fairly compact and composed of colorless thin-walled hyphae that are 2.5 to 6 μ in diameter. They are much branched and cross walls are rather conspicuous and fairly abundant. A large percentage of these walls have clamp connections, but not all of them (plate 23, figure 3).

As stated above, the affinities of the species are in doubt and its true character can never be determined until more material is collected.

Redescription. Effused, quite irregular and sometimes nodulose, thin and annual; hymenium covering the surface of configurations originally described as labyrinthiform pores but appearing in dried plants more as teeth, isolated and terete or flattened and connected at the base, pale sulphur-yellow (fide Peck) in fresh specimens, uniformly pinkish buff or cinnamon buff in dried plants, not more than 1 mm long; spores broadly ellipsoidal or globose, hyaline, 5 to 6 x 4 to 5 μ or 4 to 6 μ in diameter; trama and subiculum compact, of thin-walled, hyaline, much branched hyphae, 2.5 to 6 μ in diameter, with evident cross walls and frequent clamp connections.

On rotten wood.

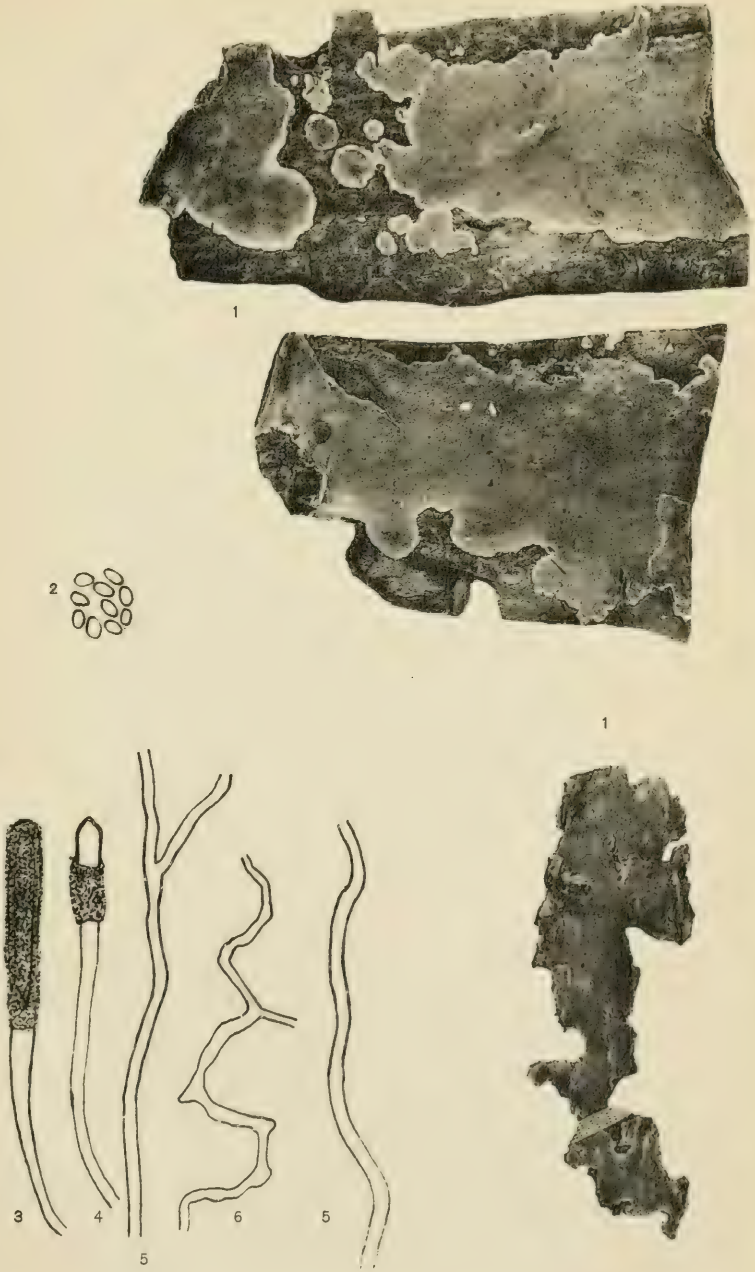
Type locality: Salamanca, N. Y. C. H. Peck. Not otherwise known to the writer.

EXPLANATION OF PLATES

Plate 1

Poris attenuata (*Peck*) *Sacc.*

1 Mature and typical plants from Westport, N. Y. In the New York State herbarium. x 1.
2 Mature spores.
3 A single cystidium showing how these bodies are formed by the enlargement and the encrusting of the ends of hyphae. From teased preparations.
4 A cystidium with part of encrustation removed.
5 Hyphae from the subiculum and the trama.
6 More irregular hypha occasionally found in the trama.
7 Portion of the type collection of this species. x 1.



PORIA ATTENUATA (Peck) Sacc.

Plate 2

Poria attenuata *(Peck) Sacc.*

1 Microphotograph of cross section of the hymenium, x 160.
  a Projecting cystidium.
  b Cross section of a cystidium embedded in the trama.

2 Vertical section of a part of a single tube showing obliquely projecting cystidia. x 320.

Poria attenuata var. subincarnata *Peck*

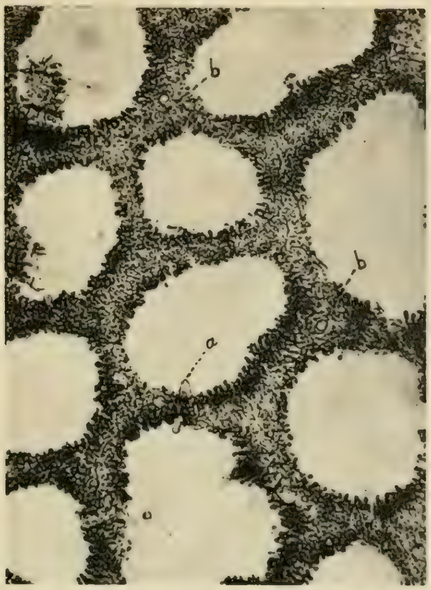
3 Fragments from specimens in the type collection. x 1.

4 Mature spores.

5 Encrusted hypha from the subiculum on the growing margin of one specimen.

6 Unencrusted hyphae as found in the trama and sometimes the subiculum.

PLATE 2



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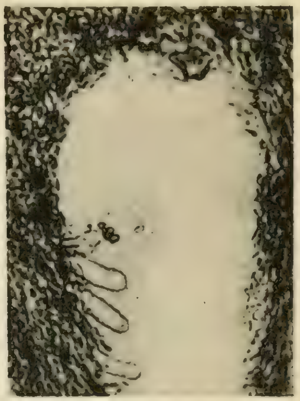

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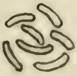

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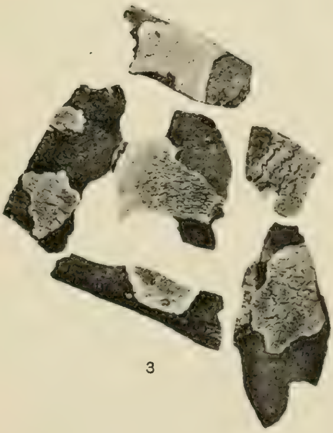

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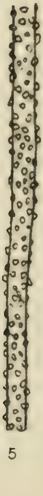

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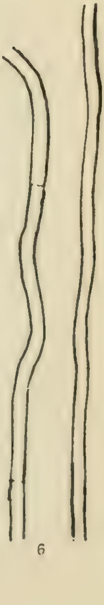

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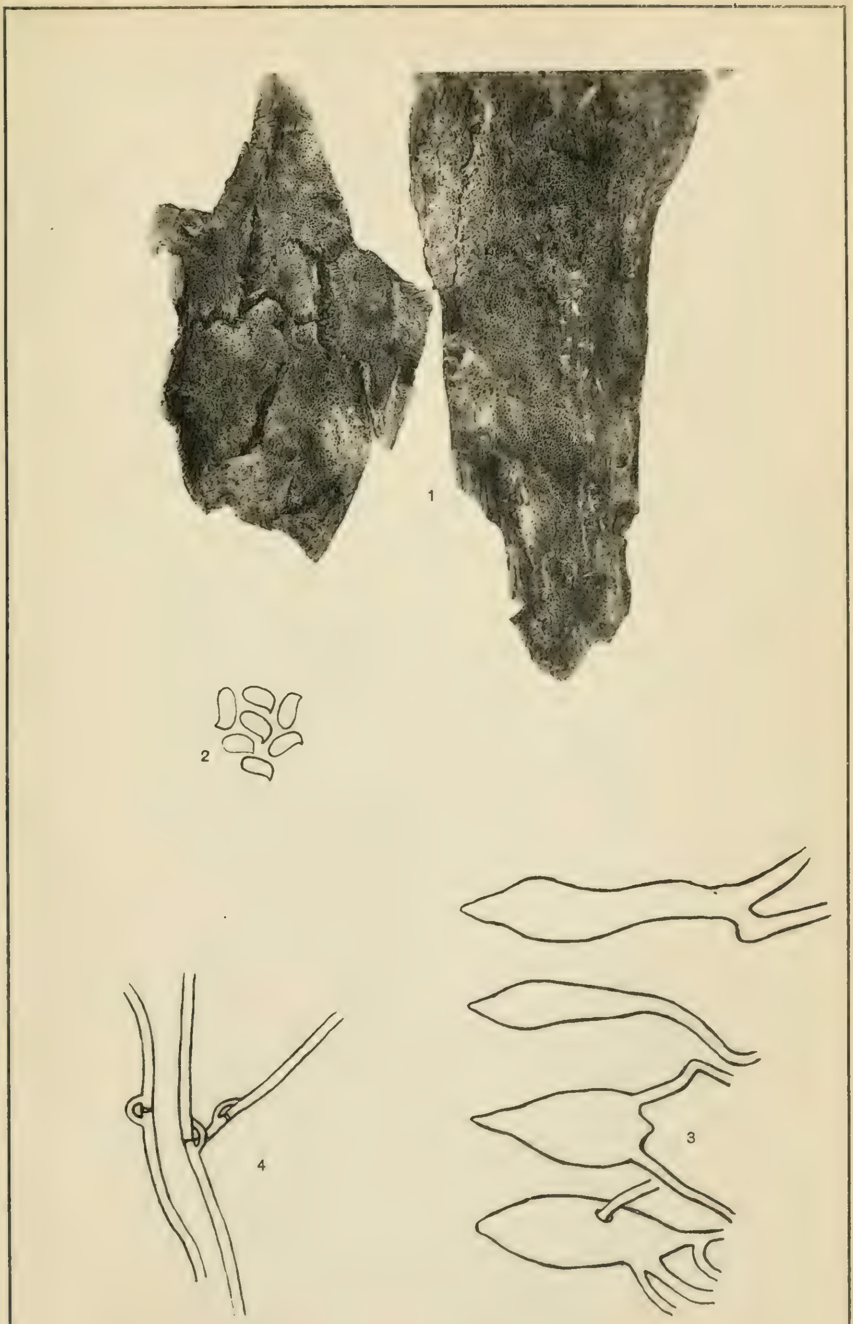
Fig. 1-2 PORIA ATTENUATA (Peck) Sacc.
Fig. 3-6 PORIA ATTENUATA var. SUBINCARNATA Peck

Plate 3

Poria aurea *Peck*

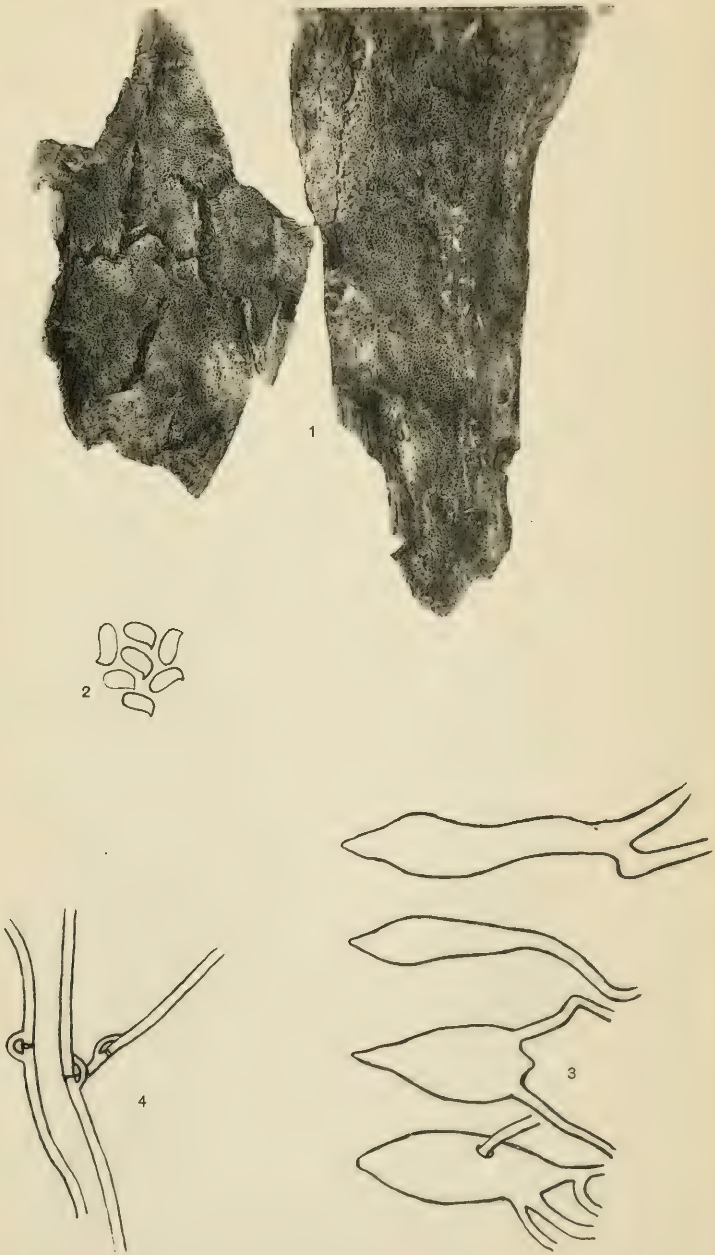
1 Specimens from the type collection. x 1.
2 Mature spores.
3 Various forms of cystidia found in the hymenium.
4 Hyphae from the trama and the subiculum.



PORIA AUREA Peck

Poria aurea *Peck*

1 Specimens from the type collection. x 1.
2 Mature spores.
3 Various forms of cystidia found in the hymenium.
4 Hyphae from the trama and the subiculum.



PORIA AUREA Peck

Plate 4

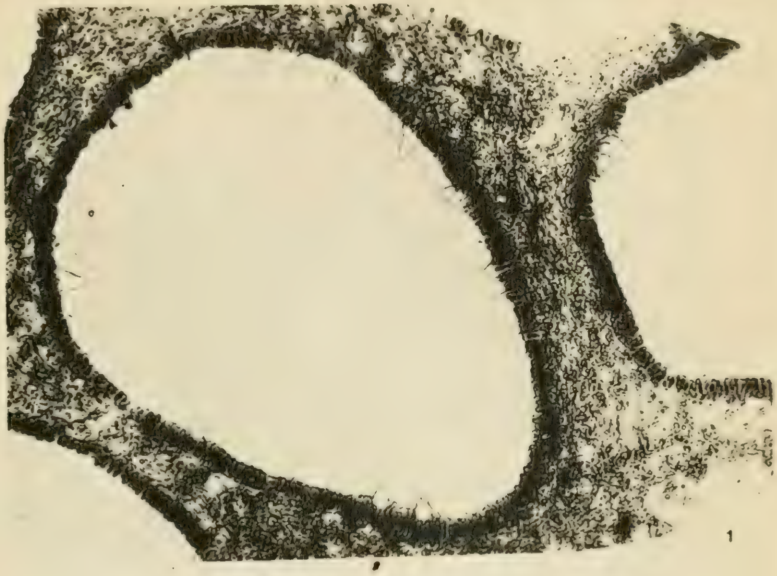
Poria aurea *Peck*

1 Microphotograph of cross section of the hymenium, showing numerous projecting cystidia. x 160.

2 Small portion of the hymenium of figure 1 enlarged to show cystidia. x 320.

Poria fimbriatella *(Peck) Sacc.*

3 Specimen in the herbarium New York State Museum, from Ampersand pond, N. Y. x 1.



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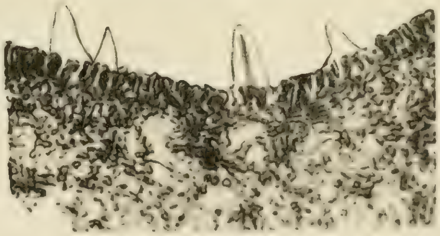

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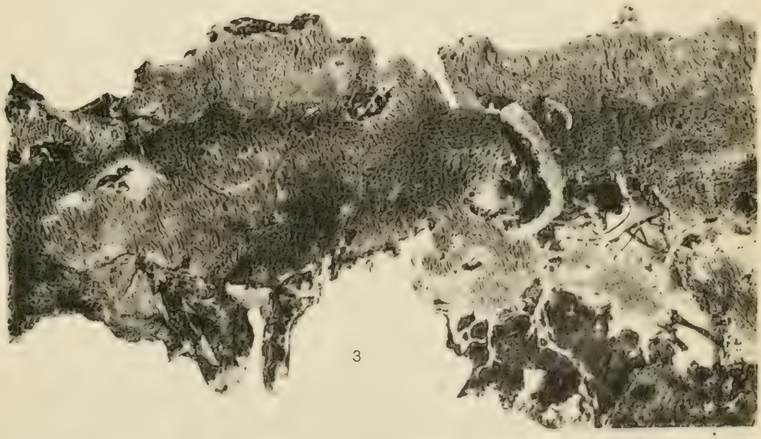

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Fig. 1-2 PORIA AUREA Peck
Fig. 3 PORIA FIMBRIATELLA (Peck) Sacc.

Plate 5

Poria fimbriatella *(Peck) Sacc.*

1 Microphotograph of cross section through hymenium, showing projecting cystidia. x 160.

2 Portion of a cross section of hymenium enlarged to show cystidia. x 320.

3 Hyphae from the trama.

4 Hyphae from the subiculum.

5 Cystidium from the hymenium of the type collection.

6 Cystidium from the hymenium of the collection from Ampersand pond, N. Y.

7 Mature spores.

(See also plate 22, figure 6, for specimen from the type collection).

Poria griseoalba *(Peck) Sacc.*

8 Specimens from the type collection. x 1.

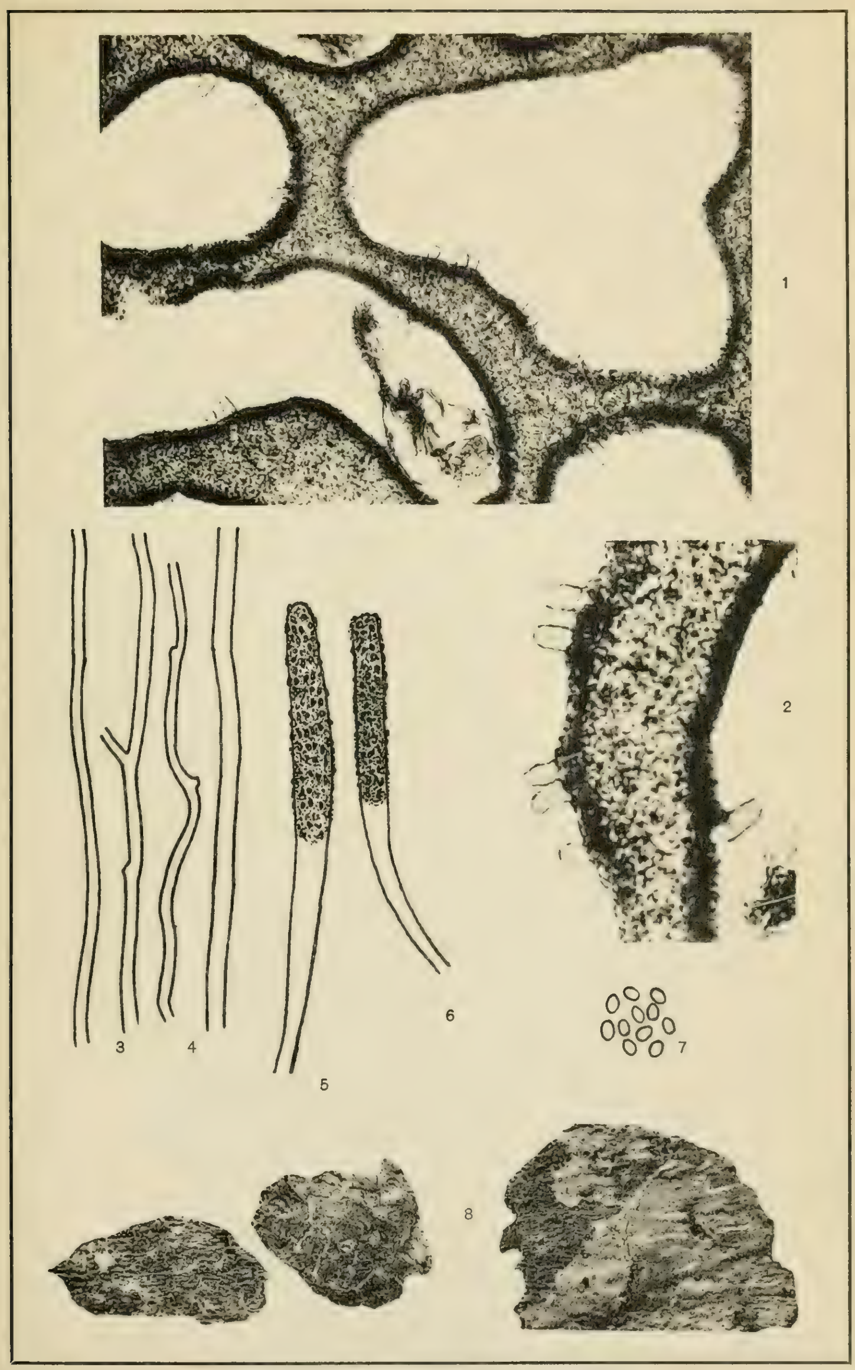


Fig. 1-7 PORIA FIMBRIATELLA (Peck) Sacc.
Fig. 8 PORIA GRISEOALBA (Peck) Sacc.

Plate 6

Poria griseoalba *(Peck) Sacc.*

1 Encrusted hypha from the subiculum.
2 Hypha from the trama, showing the origin of the basidia. See text.
3 Anastomosing hyphae from the subiculum.
4 Microphotograph of cross section of the hymenium. x 160.
5 Mature spores.

Polyporus induratus *Peck*

6 Specimens in the type collection. x 1.
7 Hypha from specimens in type collection.

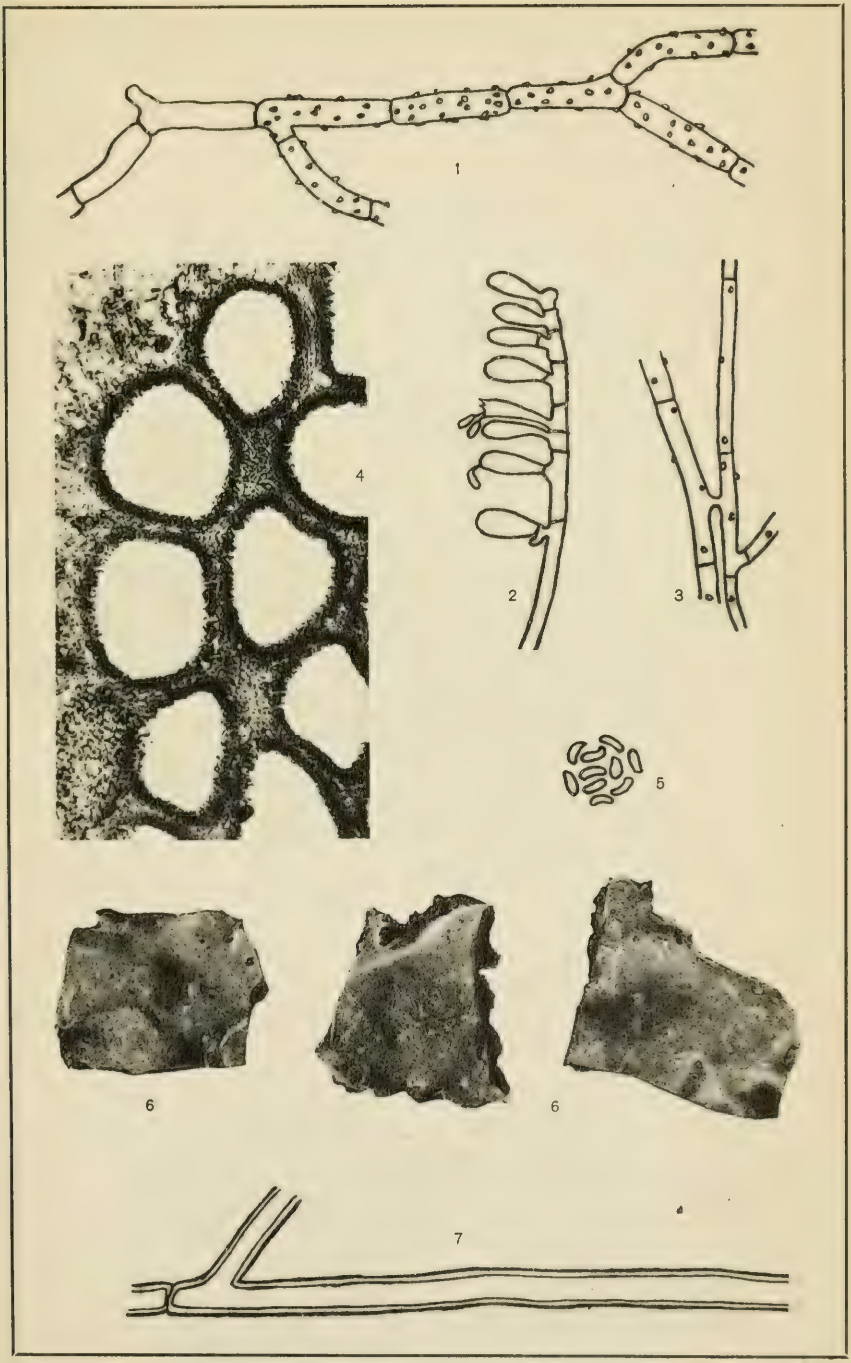


Fig. 1-5 PORIA GRISEOALBA (Peck) Sacc.
Fig. 6-7 POLYPORUS INDURATUS Peck

Plate 7

Polyporus induratus *Peck*

1 Cross section of the hymenium from specimens in the type collection. x 160.

2 Small portion of the trama as seen in cross section and enlarged. x 320.

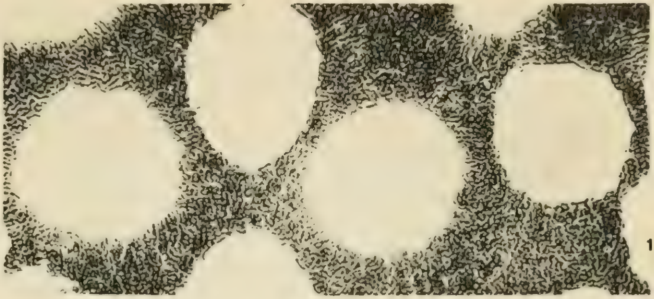
3 Enlarged lateral view of a vertical section through one of the specimens in the type collection. Made with Bausch and Lomb Micro-Tessar lens. x 10.

Poria laetifica *(Peck) Sacc.*

4 Specimen from the herbarium of L. O. Overholts, no. 3431.

5 Hyphae from the trama and the subiculum.

6 Mature spores from collection in herbarium of L. O. Overholts, no. 3431.



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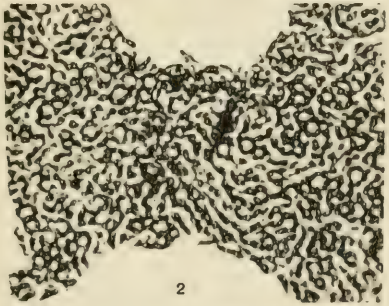

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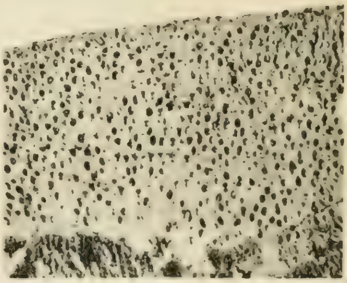

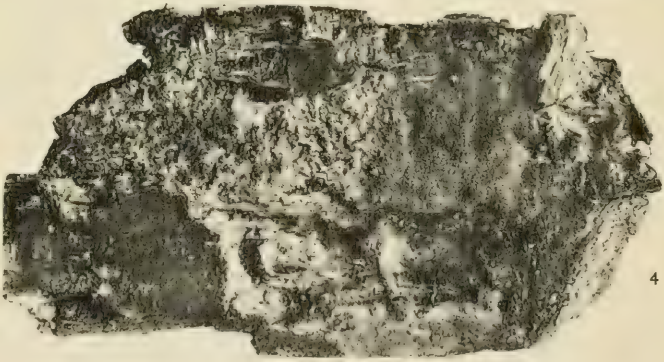

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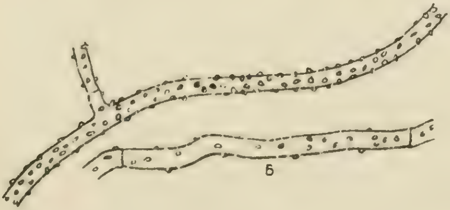

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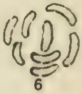

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Fig. 1-3 POLYPORUS INDURATUS Peck
Fig. 4-6 PORIA LAETIFICA (Peck) Sacc.

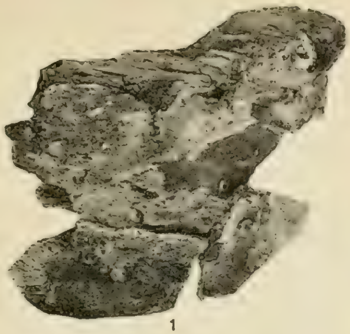
Plate 8

Poria laetifica *(Peck) Sacc.*

1 Photograph of specimen from the type material. x 1.
2 Microphotograph of cross section of the hymenium. x 160.

Poria macouni *(Peck)*

3 Photograph of the single specimen in the type collection. x 1.
4 Hyphae from the trama and the subiculum.
5 Mature spores.
6 Microphotograph of cross section of the hymenium showing prominent setae. x 160.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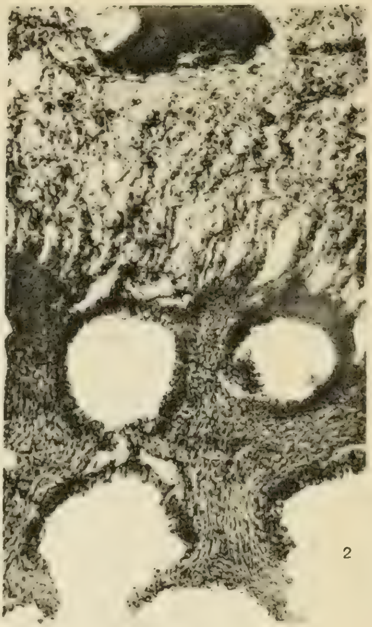
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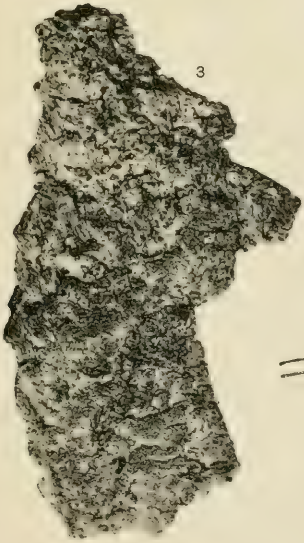
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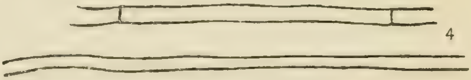
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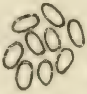
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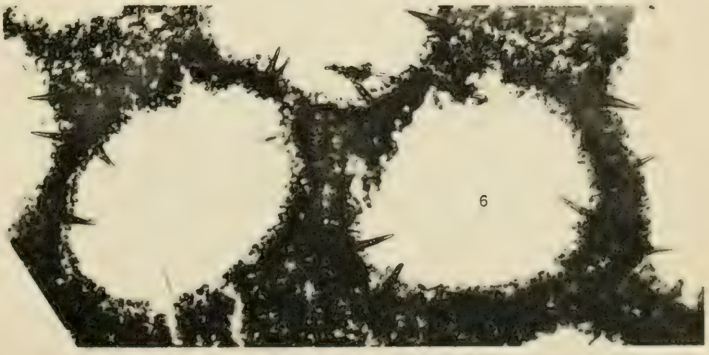
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Fig. 1-2 PORIA LAETIFICA (Peck) Sacc.
Fig. 3-6 PORIA MACOUNI (Peck) Overholts

Plate 9

Poria marginella *(Peck) Sacc.*

1 Specimens from the type collection. x 1.

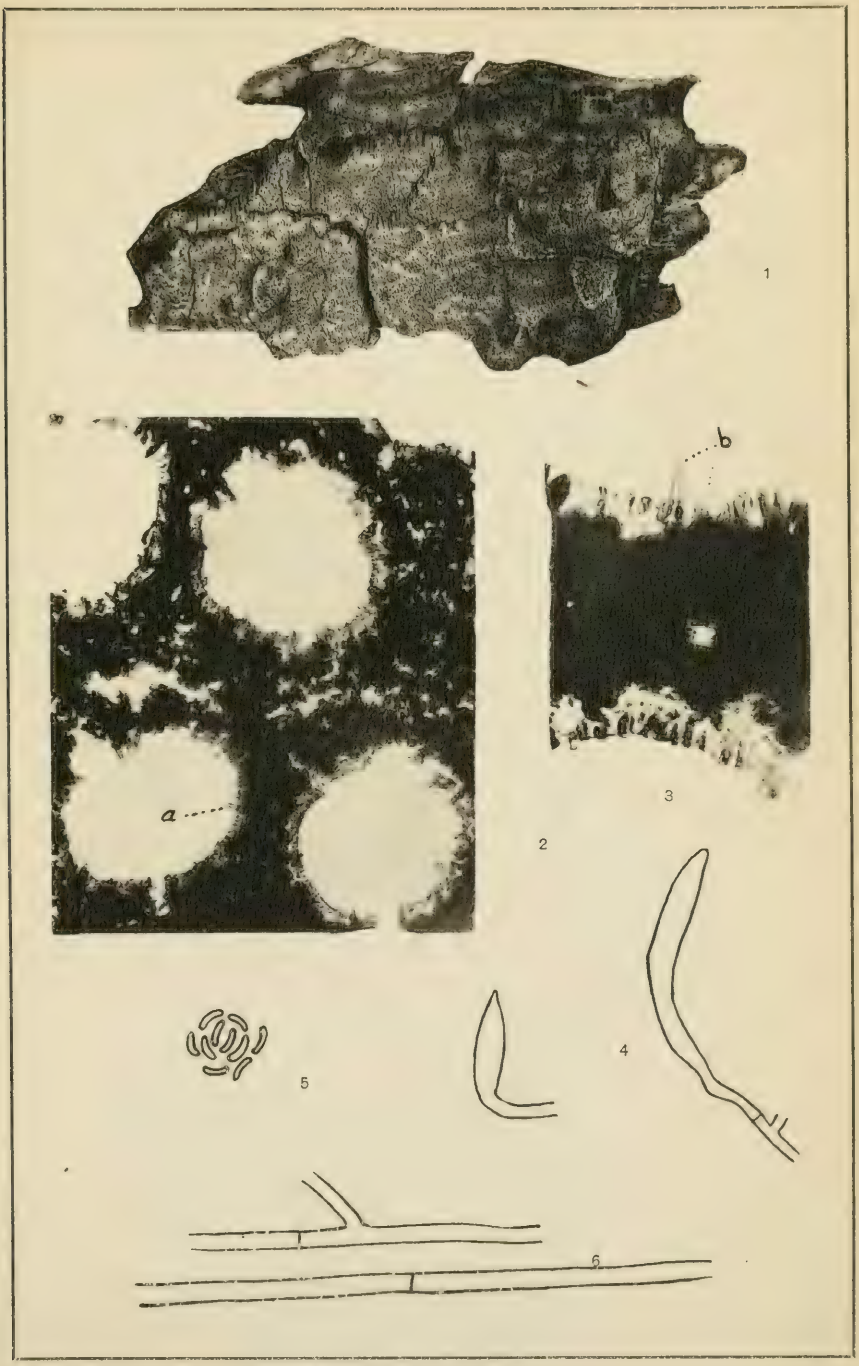
2 Microphotograph of cross section of the hymenium showing setae, as at *a*. x 160.

3 Small section of the hymenium enlarged to show setae, *b*. x 320.

4 Setae from the hymenium, as obtained in crushed preparations.

5 Mature spores.

6 Hyphae from the subiculum and the trama.



PORIA MARGINELLA (Peck) Sacc.

Plate 10

Poria mutans *(Peck) Sacc.*

1 Specimens from the type collection. x 1.
2 Mature spores.
3 Hyphae from the subiculum and the trama.
4 Microphotograph of cross section of the hymenium. x 160.

Poria mutans var. tenuis *Peck*

5 Specimens from the type collection. x 1.

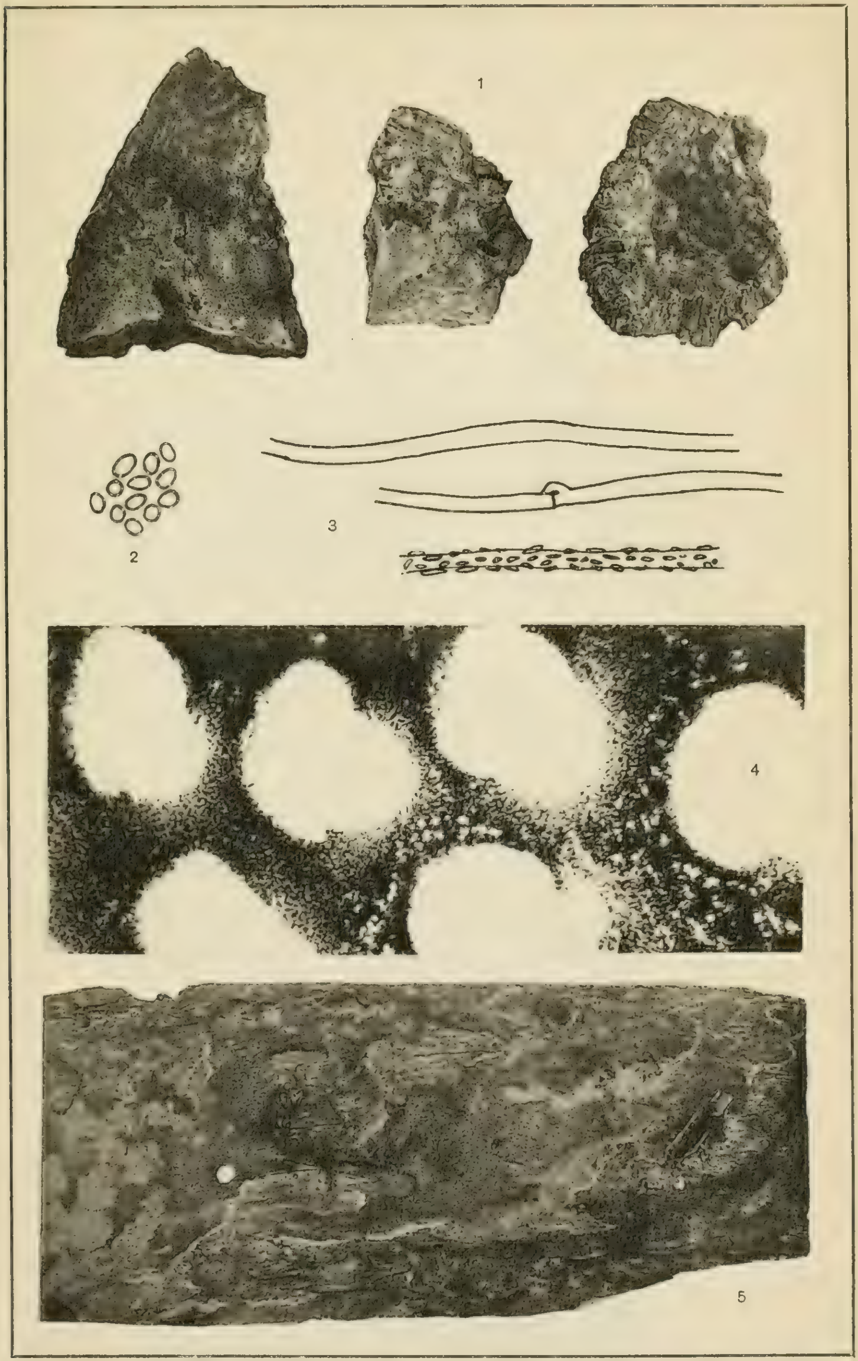


Fig. 1-4 PORIA MUTANS (Peck) Sacc.
Fig. 5 PORIA MUTANS var. TENUIS Peck

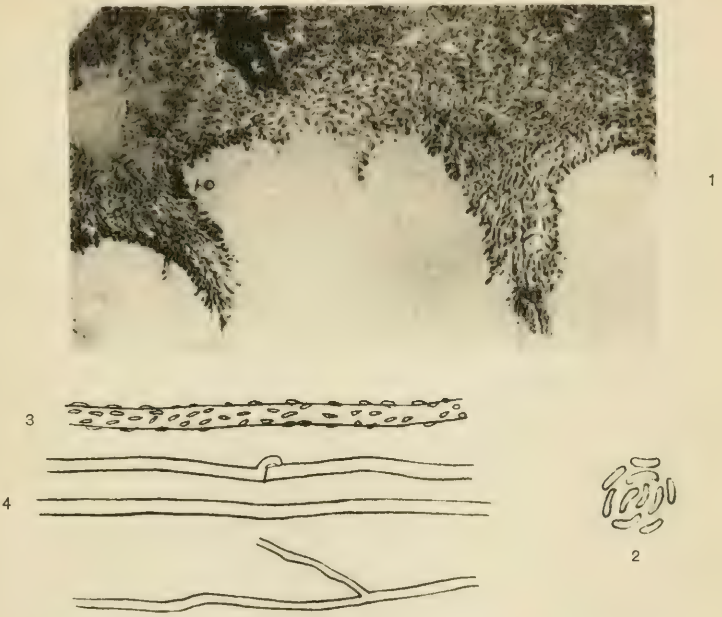
Plate 11

Poria mutans var. tenuis *Peck*

1 Microphotograph of vertical section through the hymenium. x 160.
2 Spores found free-floating in sectional preparations (see text).
3 Encrusted hyphae from the subiculum.
4 Hyphae from the trama.

Poria myceliosa *Peck*

5 Specimen from the type collection. x 1.



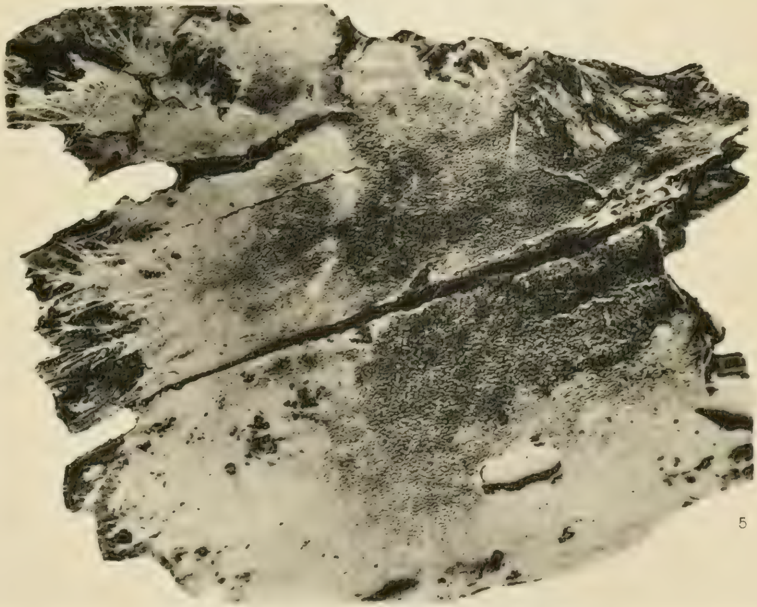


Fig. 1-4 PORIA MUTANS var. TENUIS Peck
Fig. 5 PORIA MYCELIOSA Peck

Poria mutans var. tenuis *Peck*

1 Microphotograph of vertical section through the hymenium. x 160.

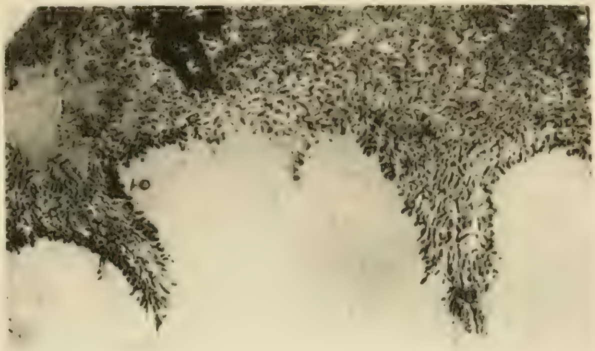
2 Spores found free-floating in sectional preparations (see text).

3 Encrusted hyphae from the subiculum.

4 Hyphae from the trama.

Poria myceliosa *Peck*

5 Specimen from the type collection. x 1.



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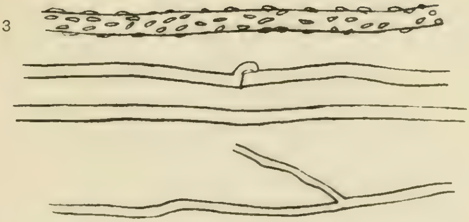

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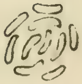

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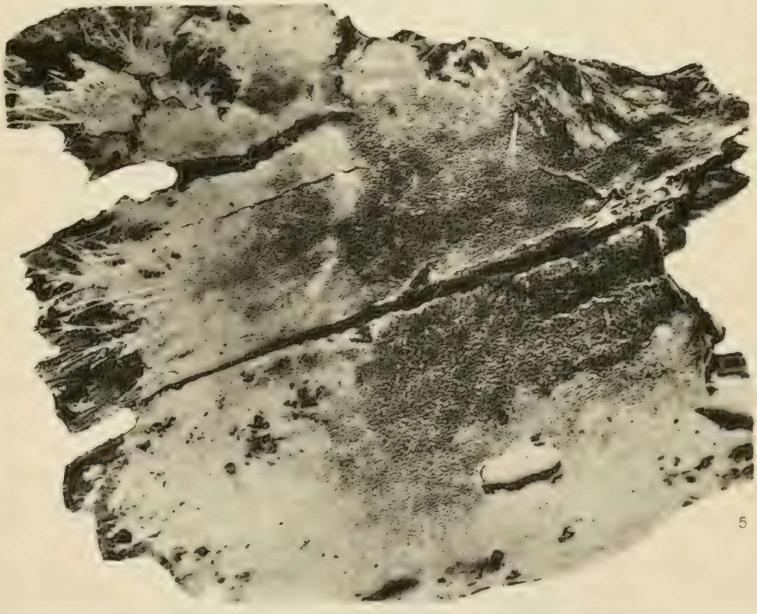

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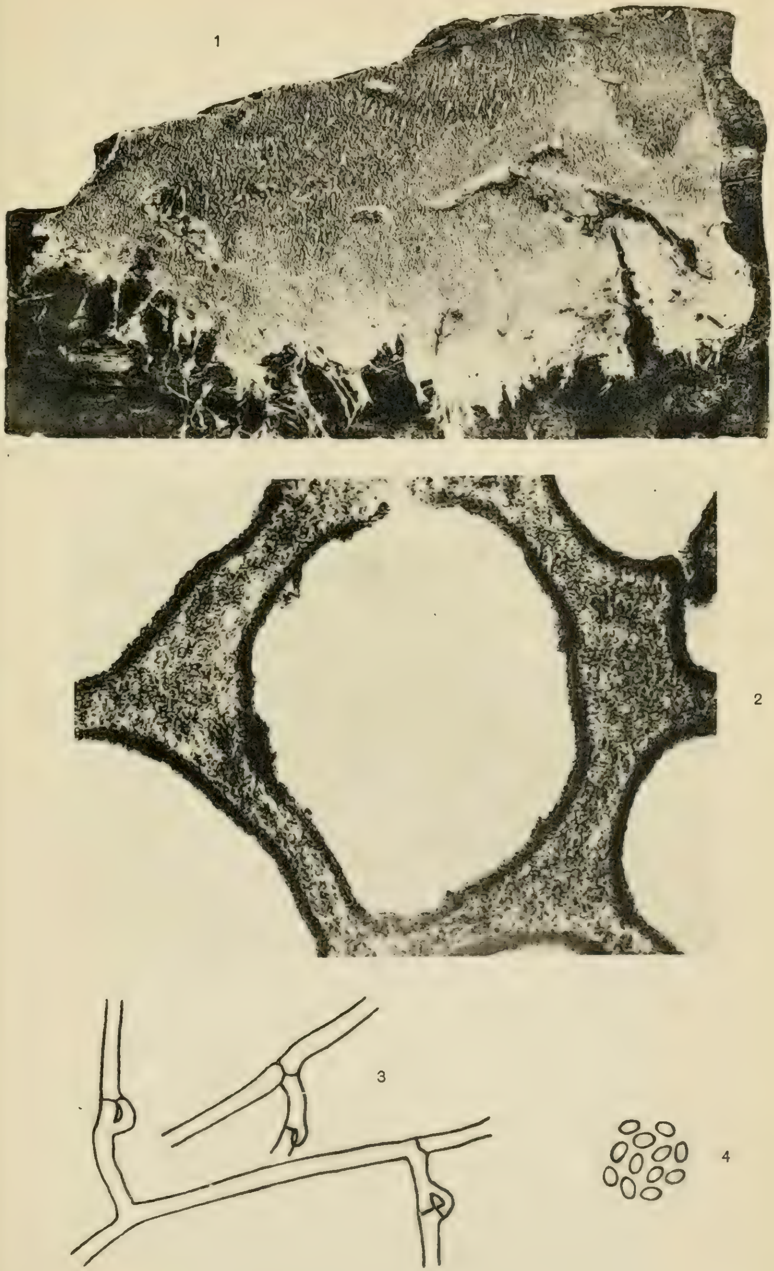
Fig. 1-4 PORIA MUTANS var. TENUIS Peck
Fig. 5 PORIA MYCELIOSA Peck

Plate 12

Poria myceliosa *Peck*

1 Photograph of specimen from the type collection. x 1.
2 Microphotograph of cross section of the hymenium. x 160.
3 Hyphae from the trama and the subiculum.
4 Mature spores.

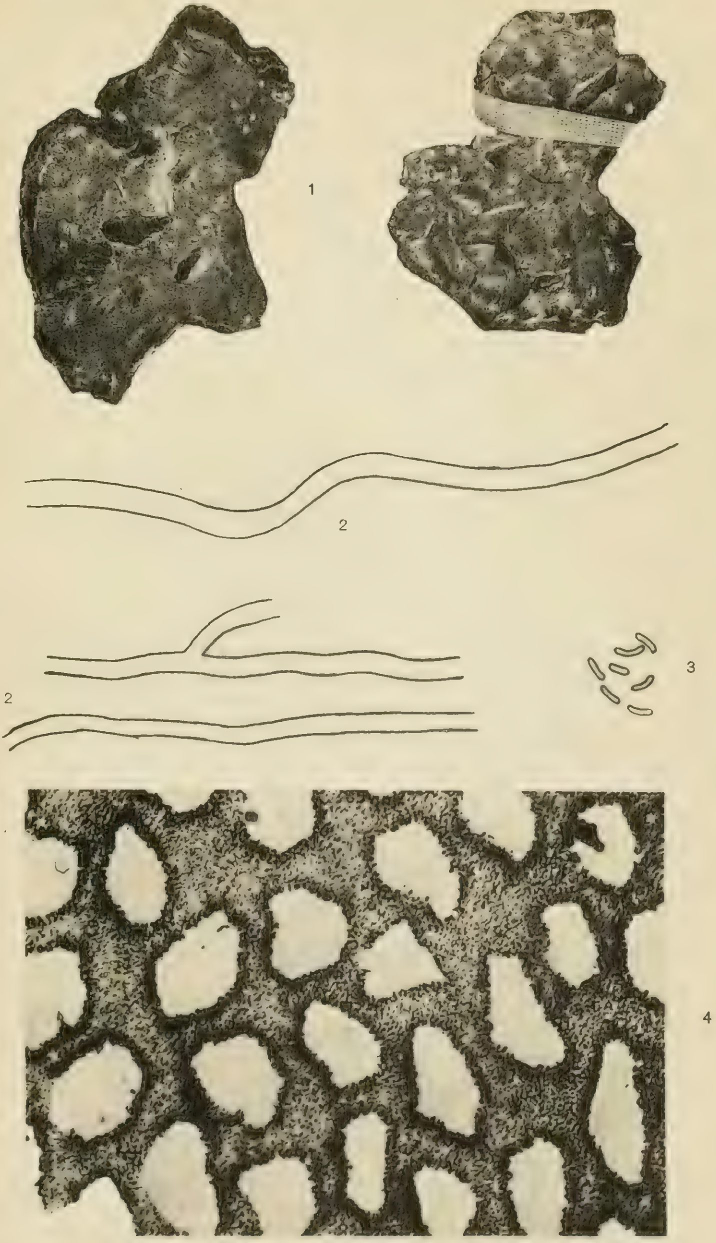


PORIA MYCELIOSA Peck

Plate 13

Poria odora *(Peck) Sacc.*

1 Specimens from the type collection. x 1.
2 Hyphae from the trama and the subiculum.
3 Mature spores.
4 Microphotograph of cross section of the hymenium. x 160.



PORIA ODORA (Peck) Sacc.

Plate 14

Poria ornata *(Peck) Sacc.*

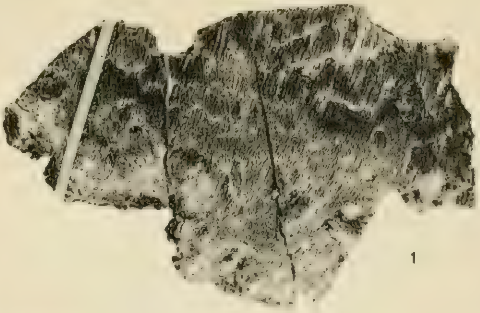
1 Specimens in the type collection. x 1.

2 Microphotograph of a partially oblique section through the hymenium. x 160.

3 Hyphae from the trama.

4 Hyphae from the subiculum, showing the knoblike outgrowths sometimes present (a, b, c), and the heavy walls characteristic of many hyphae (d).

5 Mature spores.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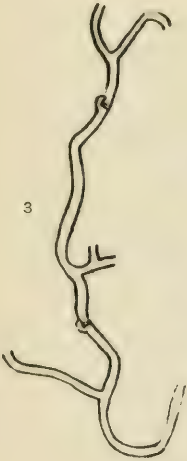
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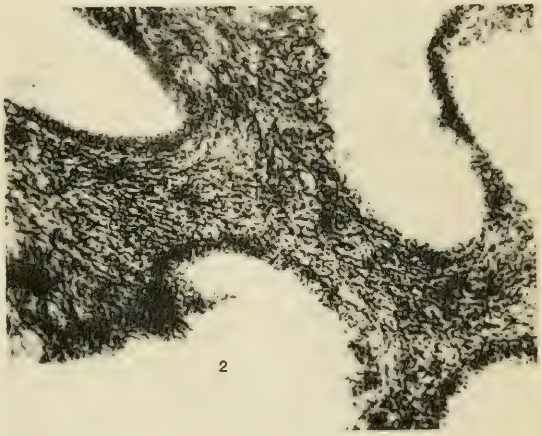
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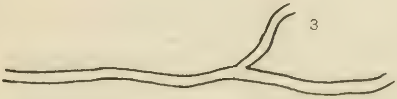
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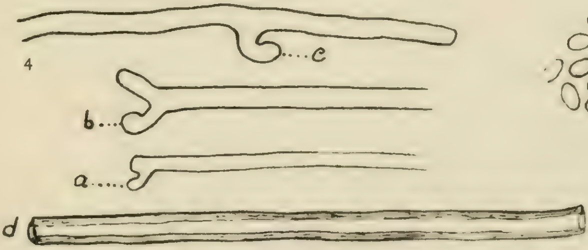

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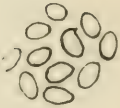
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PORIA ORNATA (Peck) Sacc.

Plate 15

Poria pinea *(Peck) Sacc.*

1 Specimens from the type collection. x 1.

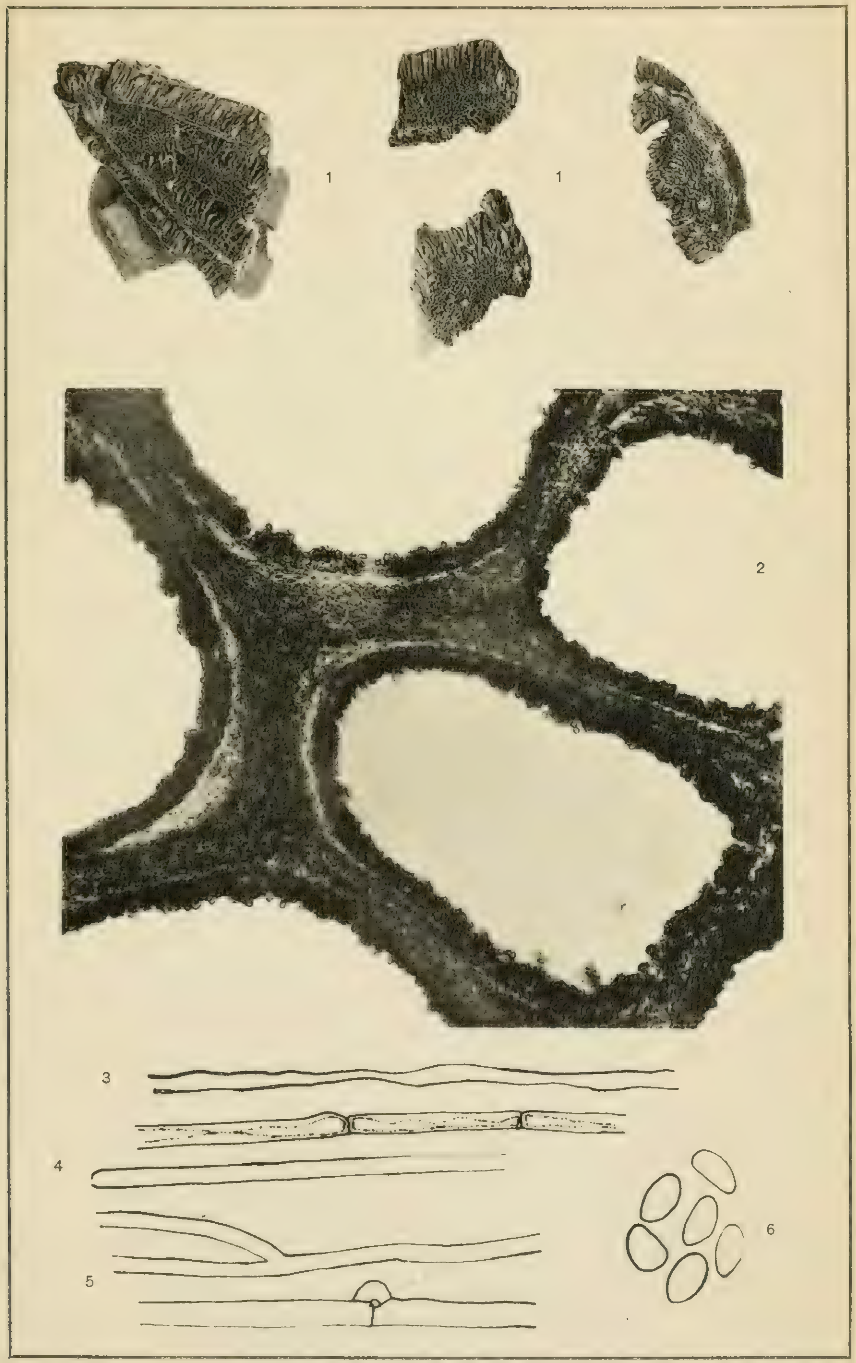
2 Microphotograph of a cross section of the hymenium. Lines of clevage are apparent between trama and hymenial layers. x 160.

3 Hypha from the trama.

4 Hyphae from the trama.

5 Hypha from the subiculum, with clamp connection.

6 Mature spores.

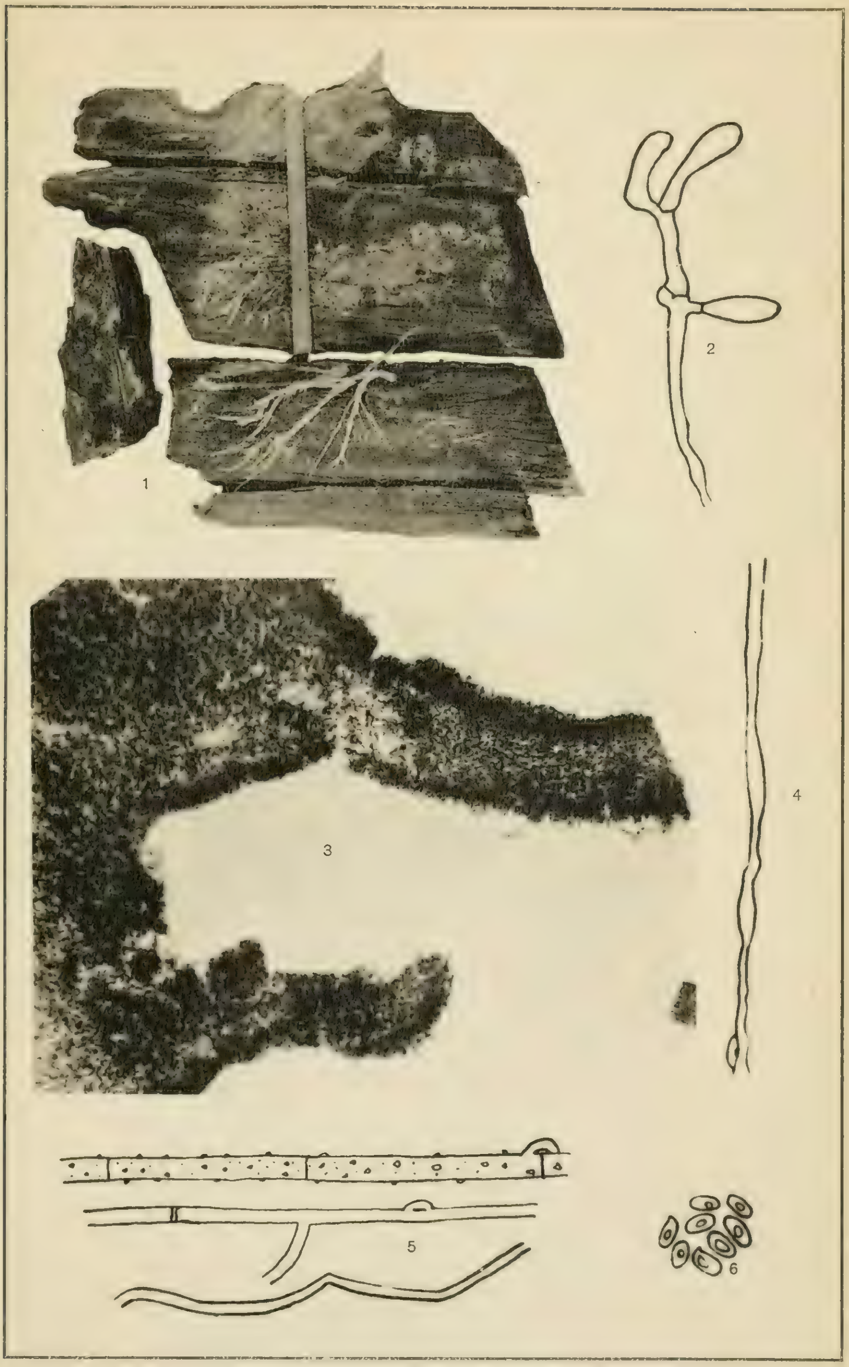


PORIA PINEA (Peck) Sacc.

Plate 16

Poria radiculosa *(Peck) Sacc.*

1 Major portion of the material in the type collection. x 1.
2 Immature basidia.
3 Microphotograph of vertical section through the hymenium. x 160.
4 Hyphae from the subiculum.
5 Hyphae from the trama.
6 Mature spores.



PORIA RADICULOSA (Peck) Sacc.

Plate 17

Poria semitincta (*Peck*) *Sacc.*

1 Specimens from the type collection. x 1.
  - *a* Growing on the surface of a dead fallen leaf.
  - *b* Growing on rotten wood.

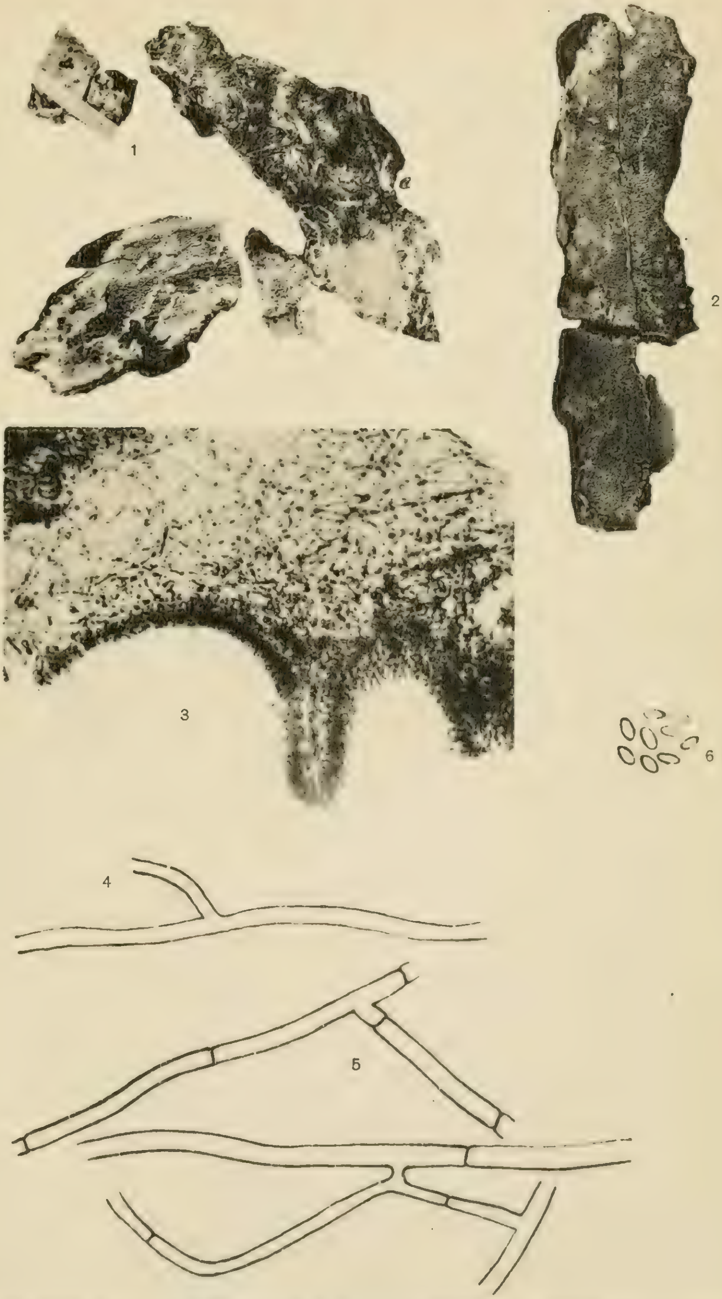
2 Specimen in New York State Museum herbarium, collected at South Bethlehem, N. Y. x 1.

3 Microphotograph of vertical section through hymenium. x 160.

4 Single hypha from the trama.

5 Hyphae from the subiculum and the growing margin. This type also represented in the trama.

6 Mature spores.



PORIA SEMITINCTA (Peck) Sacc.

Plate 18

Poria setigera *Peck*

1 Mature specimens from the type collection. x 1.

2 Young specimens from the type collection, showing the broad sterile margin and the covering of hairlike setae. x 1.

3 Vertical section through the hymenium and subiculum showing the setalike bodies projecting into the lumen of the tubes and embedded in the trama. At *a* are projecting setae of the usual type. x 160.

4 Enlargement of a part of the specimen (at X) shown in figure 2, showing the bristlelike projecting hairs. x 10. Photographed with the aid of a Bausch and Lomb Micro-Tessar lens.

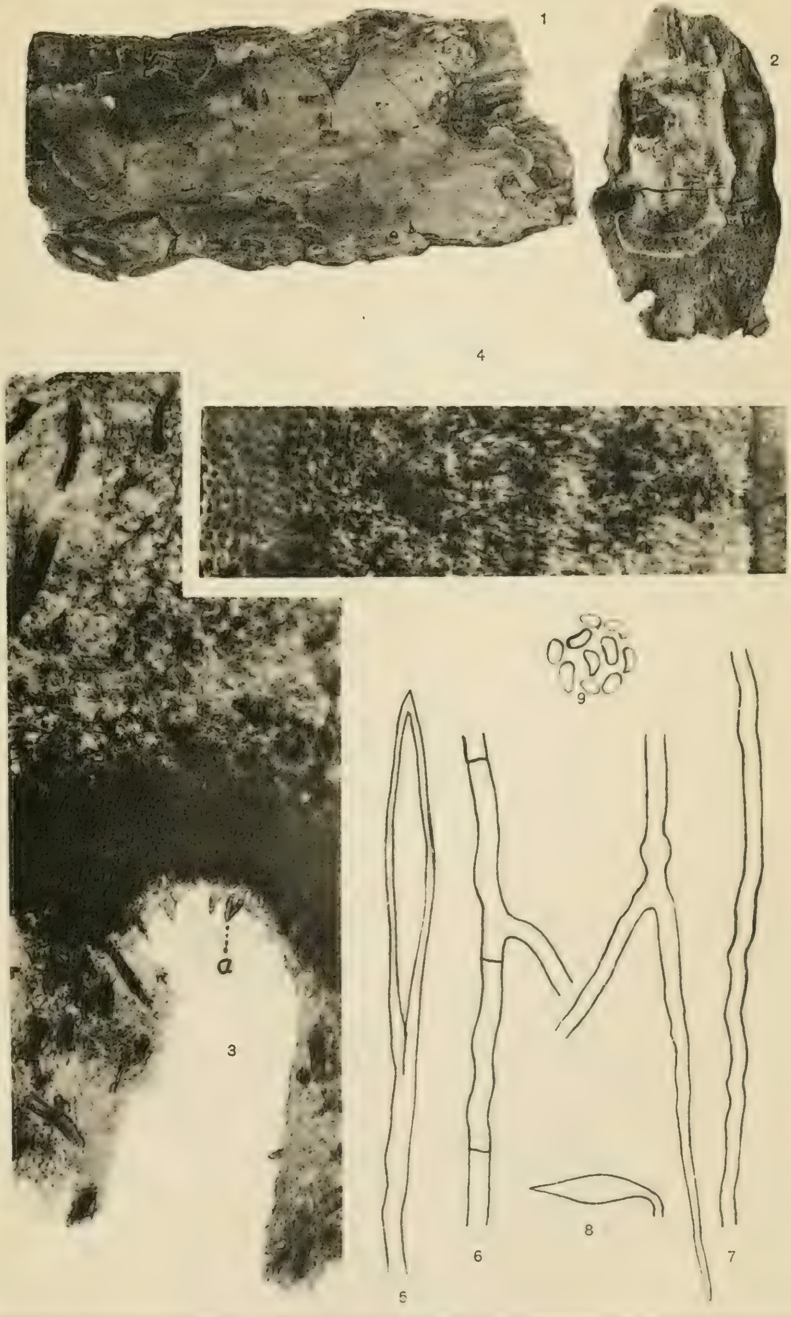
5 One of the large embedded setae.

6 Hypha from the subiculum.

7 Hypha from the trama.

8 A small seta of the usual type, from teased preparations.

9 Mature spores.



PORIA SETIGERA Peck

Plate 19

Poria subacida *(Peck) Sacc.*

1 Specimen from the type collection. x 1.

Poria subacida var. stalactitica *Peck*

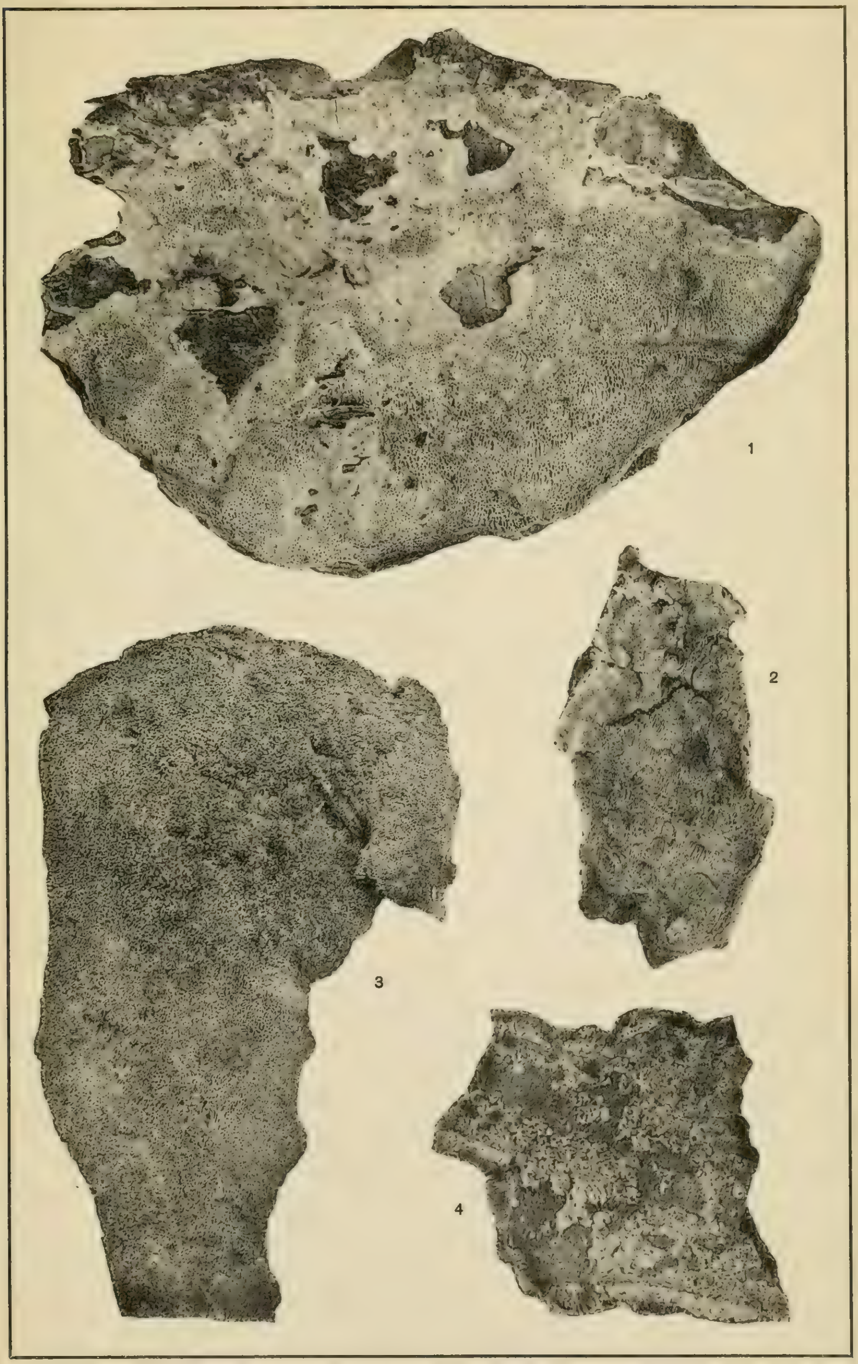
2 Specimen from the type collection. x 1.

Poria subacida var. vesiculosa *Peck*

3 Specimen from the type collection. x 1.

Poria subacida var. tuberculosa *Peck*

4 Specimen from the type collection. x 1.



PORIA SUBACIDA (Peck) Sacc.

Plate 20

Poria subacida *(Peck) Sacc.*

1 Microphotograph of cross section of the hymenium from specimen in the type collection. x 160.

2 Microphotograph of cross section of the hymenium from specimens in the New York State herbarium, collected by C. H. Peck at Floodwood, N. Y. x 160.

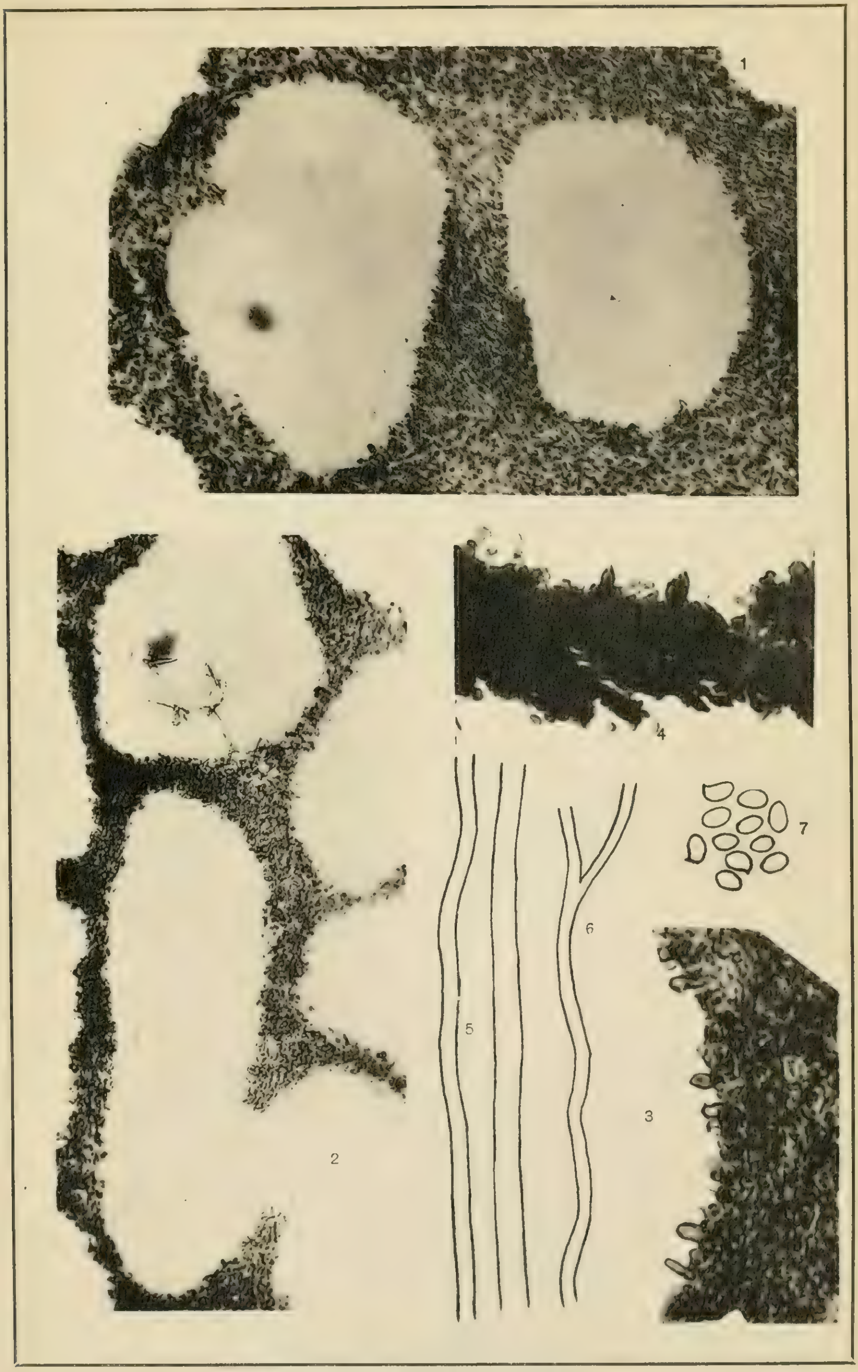
3 Enlarged microphotograph of a small part of the hymenium of Poria subacida var. tenuis Peck, from specimens in the type collection, showing projecting cystidialike bodies. x 320.

4 Enlarged microphotograph of a small part of the hymenium of P. subacida, showing cystidialike bodies. x 320.

5 Hyphae from the subiculum.

6 Hyphae from the trama.

7 Mature spores.



PORIA SUBACIDA (Peck) Sacc.

Plate 21

Poria subiculosa *(Peck) Sacc.*

1 Specimen from the type collection. x 1.
2 Microphotograph of cross section of the hymenium. x 160.
3 Hyphae from the trama.
4 Hypha from the subiculum.
5 Mature spores.

Poria subacida var. tenuis *Peck*

6 Specimen from the type collection. x 1.

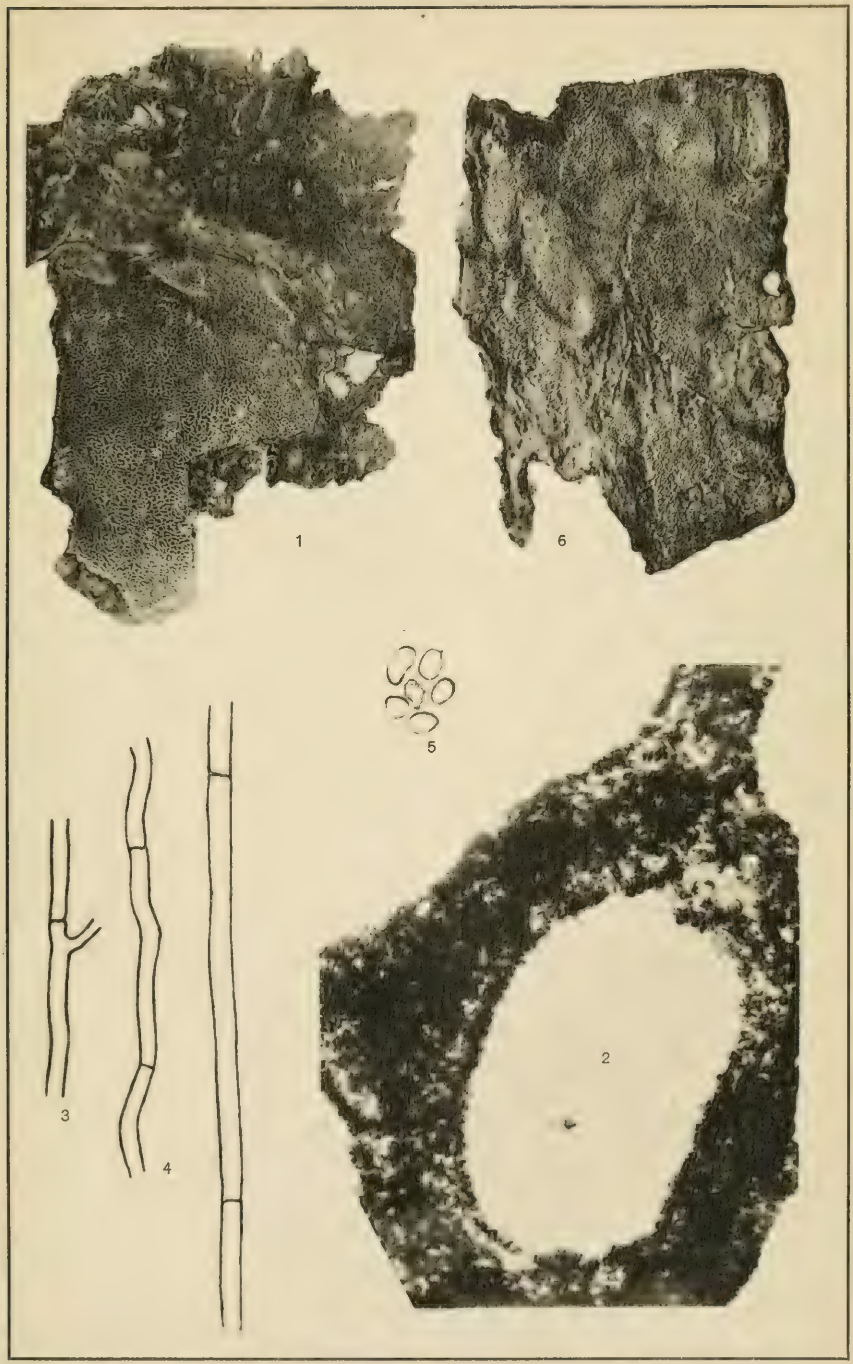


Fig. 1-5 PORIA SUBICULOSA (Peck) Sacc.
Fig. 6 PORIA SUBACIDA var. TENUIS Peck

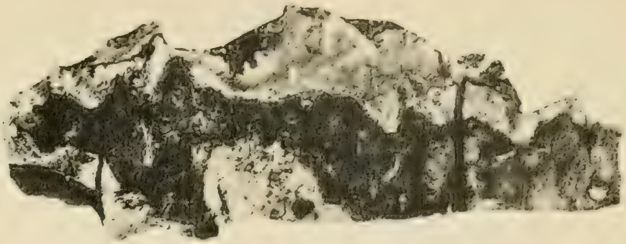
Plate 22

Poria sulphurella *(Peck) Sacc.*

1 Specimen from the type collection. x 1.
2 Microphotograph of cross section of the hymenium. x 160.
3 Hypha from the subiculum.
4 Hyphae from the trama.

Poria fimbriatella *(Peck) Sacc.*

5 Specimen from the type collection. x 1.



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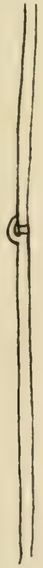

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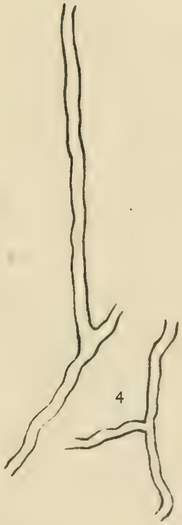

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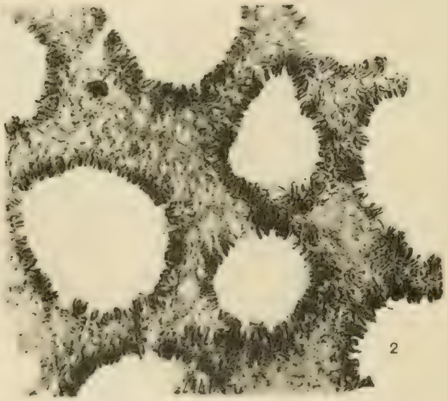

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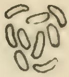

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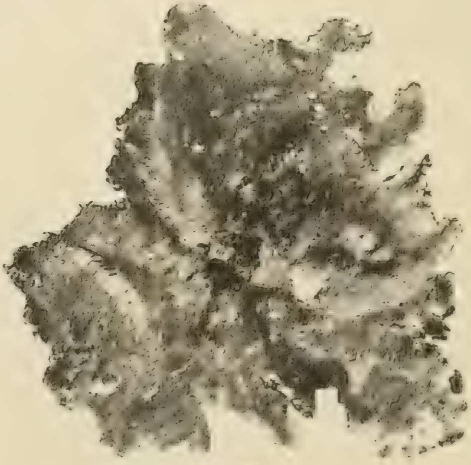

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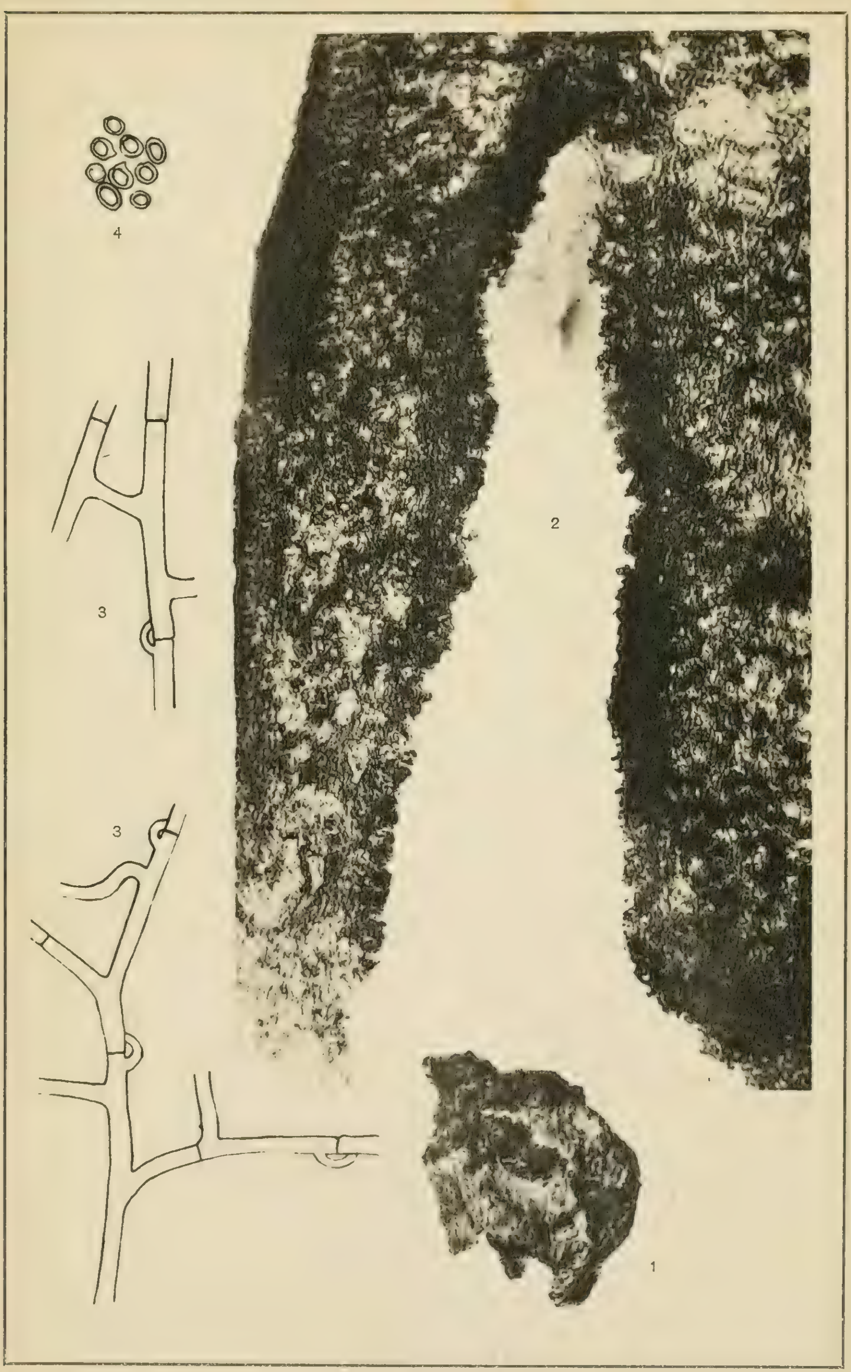
Fig. 1-5 PORIA SULPHURELLA (Peck) Sacc.
Fig. 6 PORIA FIMBRIATELLA (Peck) Sacc.

Plate 23

Daedalea sulphurella *Peck*

1 Photograph of small fragments from the type collection. x 2.
2 Microphotograph of vertical section through the hymenium. x 160.
3 Hyphae from the subiculum.
4 Mature spores.



DAEDALEA SULPHURELLA Peck

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